

FUJITSU PCI Gigabit Ethernet 4.1 Update2 / 5.0 for Oracle Solaris



User's Guide

Solaris

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Preface

Purpose

This manual describes how to install the Gigabit Ethernet card into your SPARC Enterprise system, and configure the environmental settings for the interface.

Target Reader

This manual is intended for system administrators responsible for installing the Gigabit Ethernet card.

To understand the concepts and procedures presented in this manual, you need a few years of experience in Oracle Solaris (in this manual, abbreviated to Solaris) system administration and have a basic knowledge of networked systems.

Organization

This section describes how this manual is organized.

[Chapter 1 Product Outline](#)

Chapter 1 describes the distinctive features of the Gigabit Ethernet Card.

[Chapter 2 Gigabit Ethernet Card Installation](#)

Chapter 2 describes how to install the Gigabit Ethernet card.

[Chapter 3 Setting Instructions](#)

Chapter 3 provides an overview of the environment definition.

[Chapter 4 LinkAggregation Feature](#)

Chapter 4 describes how to use the LinkAggregation function.

[Chapter 5 Troubleshooting](#)

Chapter 5 provides information about how to troubleshoot and resolve problems you might encounter during installation.

[Appendix A Messages](#)

Appendix A explains the messages output by the driver software.

[Appendix B Gigabit Ethernet Card LED Diagnosis](#)

Appendix B explains details of the Gigabit Ethernet card LED diagnostics.

[Appendix C Using FUJITSU PCI GigabitEthernet in a Cluster Environment](#)

Appendix C describes notes when using the card in a Cluster System.

[Appendix D Using FUJITSU PCI GigabitEthernet in Solaris Containers](#)

Appendix D describes notes when using the card in Solaris Containers.

[Appendix E Using FUJITSU PCI GigabitEthernet in Oracle VM Server for SPARC](#)

Appendix E describes notes when using the card in Oracle VM Server for SPARC.

[Appendix F Using FUJITSU PCI GigabitEthernet in Solaris 11 Network Virtualization](#)

Appendix F describes notes when using the card in Solaris 11 Network Virtualization.

[Appendix G PCI Slot Number and Device Name](#)

Appendix G shows the PCI slot number and device name list for each SPARC Enterprise model.

Symbol

The following symbols are used in this manual:



Note

- This symbol indicates that important information is given.



Information

- This symbol indicates that useful information is given.

Handling of This Manual

This manual contains important information regarding the use and handling of this product. Read this manual thoroughly. Pay special attention to the section "Important Warnings". Use the product according to the instructions in this manual.

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14th Edition: October 2011

Attention

- The contents of this manual may be revised without prior notice.

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Revision History

Edition	Date	Details
01	2003-2-20	-
02	2003-5-1	PRIMEPOWER1/100 was supported
03	2004-1-8	VLAN function was supported
		Support switches was added
		Changed the Version 2.0 to 2.1
04	2004-10-28	LinkAggregation function was supported

Edition	Date	Details
		Support switches was added
		Changed the Version 2.1 to 2.2
05	2005-11-11	Quad Gigabit Ethernet card(PW008QG1) was supported
		Changed the Version 2.2 to 2.3
06	2006-2-06	RoHS compliant 1port Gigabit Ethernet Card(PW0G8GE1, PW0G8GE2) was supported
		Changed the Version 2.3 to 2.4
07	2007-1-20	PCI Express Gigabit Ethernet Card(SE0X7GD1X, SE0X7GD2X, SE0X7CQ1X) was supported
		Changed the Version 2.4 to 3.0
08	2007-4-03	Changed the Version 3.0 to 3.0 Update1
09	2008-2-29	GLDv3(The LinkAggregation Feature of dladm(1M) command, Solaris Containers, Logical Domains) was supported
		Changed the Version 3.0 Update1 to 3.0 Update2 / 4.0
10	2008-8-29	PCI Express Gigabit Ethernet card(SE0X7GQ2X) was supported
		Changed the Version 3.0 Update2 / 4.0 to 3.0 Update3 / 4.0 Update1
11	2010-2-1	Added the parameters and the setting method of new style to the operation mode setup
		Deleted the PRIMEPOWER and GP7000F family
		Changed the Version 3.0 Update3 / 4.0 Update1 to 3.0 Update3 / 4.1
13	2010-12-17	Deleted the driver version 3.0 Update3.
		Changed the name of Solaris to Oracle Solaris.
		Changed the name of Logical Domains(LDoms) to Oracle VM Server for SPARC.
		Changed the Version 3.0 Update3 / 4.1 to 4.1 Update1.
14	2011-10-25	Solaris 11 Network Virtualization(Vanity Naming, Environment Setting with the ipadm(1M) command, VLAN by dladm(1M) command, VNIC by dladm(1M) command, Operation Mode Setup by dladm(1M) command, Flow by flowadm(1M) command) was supported.
		Added The SPARC T3 series.
		Changed Sun Microsystems Documentation to Oracle Documentation.
		Changed the Version 4.1 Update1 to 4.1 Update2 / 5.0.

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Chapter 1 Product Outline

This chapter describes the following topics.

- [1.1 Key Features](#)
- [1.2 Gigabit Ethernet Card Specifications](#)

1.1 Key Features

The Gigabit Ethernet cards covered in this manual are adapters designed for Solaris servers that are connected to a Gigabit Ethernet network. These cards provide the physical services and data link services defined by IEEE802.3, and are designed to work in a framework of the open system architecture used widely now. These cards are integrated under various network protocols (TCP/IP supported by a driver) by the installation of a host software driver (*1).

These cards are also available for use in FUJITSU PRIMECLUSTER and PRIMECLUSTER GLS environments (*2).

The Gigabit Ethernet cards are available for use in SPARC Enterprise servers with operating system Solaris 10 8/07 or later.

The key features of the Gigabit Ethernet cards are listed in "[Table 1.1 Gigabit Ethernet Card Features](#)".

*1: The name of the host software driver for Gigabit Ethernet cards is "fjgi".

*2: The Multipath Function of PRIMECLUSTER GLS is not supported. Only the redundant line control of PRIMECLUSTER GLS is only supported.

Table 1.1 Gigabit Ethernet Card Features

Key Features
IEEE802.3 compliant 1000Base-SX * 2ports(SE0X7GD2X), 10/100/1000 Base-T * 2ports(SE0X7GD1X), 10/100/1000 Base-T * 4ports(SE0X7GQ1X, SE0X7GQ2X) JumboFrame feature nnd(1M) command support (*1) VLAN (IEEE 802.1Q TagVLAN) LinkAggregation (*2) (IEEE 802.3) IPv4/IPv6 GLDv3 compliant (*3) Solaris 11 Network Virtualization (*4)

*1: nnd(1M) command is not supported by FUJITSU PCI GigabitEthernet 5.0 or later.

*2: For more information about the LinkAggregation, please refer to "[Chapter 4 LinkAggregation Feature](#)".

*3: The GLDv3 compliant driver works on the SPARC Enterprise whose operating system is Solaris 10 8/07 or later.

*4: Solaris 11 Network Virtualization work with FUJITSU PCI GigabitEthernet 5.0 or later.

- JumboFrame Feature

Although the maximum frame size of one Ethernet packet is 1518 bytes, by using the JumboFrame feature it becomes possible to set the maximum frame size from 1518 bytes to 9018 bytes. When comparing the same size of transmitted data, the JumboFrame feature can decrease the CPU load and improve transmission speed by reducing the number of packets.

- Point to Point Connection

Direct connection between Gigabit Ethernet cards is forbidden, except when used in the private LAN of a CLUSTER system (PRIMECLUSTER).

- GLDv3 Architecture

New network stacks and a new device driver framework (called GLDv3) are introduced into Solaris 10. In addition, a new dladm(1M) command to manage the data links is provided.

The GLDv3 compliant driver works with the following features.

- The LinkAggregation (based on IEEE 802.3) by the dladm(1M) command.
- Solaris Containers (Exclusive-IP Non-Global Zones)
- Oracle VM Server for SPARC

The GLDv3 compliant driver does not work with the following features.

- SNA/FNA
- The Multipath Function of PRIMECLUSTER GLS.

The following feature was changed.

- Set instance number by ndd(1M) command.

Solaris 11 Network Virtualization

New features, Vanity Naming and Environment Setting by ipadm(1M) command, are introduced into Solaris 11. In addition, dladm(1M) command and Network Virtualization are extended and New flowadm(1M) command controlled network flow is provided. FUJITSU PCI GigabitEthernet 5.0 or later works with the following features.

- Vanity Naming.
- Environment Setting by ipadm(1M) command.
- VLAN by dladm(1M) command.
- VNIC by dladm(1M) command.
- Operation Mode Setup by dladm(1M) command.
- Flow by flowadm(1M) command.

The following feature was changed.

- Configuration of the LinkAggregation feature by the dladm(1M) command.

1.2 Gigabit Ethernet Card Specifications

The Gigabit Ethernet card is an adapter that is installed into a PCI Express slot.

1.2.1 Specifications

The specifications of the GigabitEthernet cards are listed in "[Table 1.2 PCI Gigabit Ethernet Card Specification](#)".

Table 1.2 PCI Gigabit Ethernet Card Specification

Item	Hardware Specification
Host Bus Interface	PCI Express 1.0a (SE0X7GD1X, SE0X7GD2X) PCI Express 1.1 (SE0X7GQ1X, SE0X7GQ2X)
Network Interface	1000Base-SX * 2ports (SE0X7GD2X) 10/100/1000Base-T * 2ports (SE0X7GD1X) 10/100/1000Base-T * 4ports (SE0X7GQ1X, SE0X7GQ2X)
Host Data Transfer	SE0X7GD1X, SE0X7GD2X, SE0X7GQ2X: PCI Express 4lane Bus Mastering DMA Transfers SE0X7GQ1X: PCI Express 8lane Bus Mastering DMA Transfers
Bus Type	One PCI Express slot per card.

Item	Hardware Specification
Power Requirements	Maximum: 9.1W (SE0X7GD1X), 9.2W (SE0X7GD2X), 15.0W (SE0X7GQ1X), 12.8W (SE0X7GQ2X)
Connections	1000Base-SX (SE0X7GD2X): Multi-mode Fibre LC-SC: 62.5/125 micron and 50/125 micron (Card side is LC. Used when connecting to a device with an SC connector.), LC-LC: 62.5/125 micron and 50/125 micron 10/100/1000Base-T (SE0X7GD1X, SE0X7GQ1X, SE0X7GQ2X): CAT5e Cable (CAT5 cable can also be used for 10/100Mbps.)



Note

- SE0X7GD2X only support full duplex connection. Half-duplex connection is not supported.
- When using 1000Mbps transmission rate with SE0X7GD1X, SE0X7GQ1X and SE0X7GQ2X, "Auto-Negotiation" must be set to "on".

1.2.2 Part Names and Features of Hardware

Figure 1.1 to 1.4 shows the appearance of the Gigabit Ethernet cards. The part names and features are listed as follows.

- Connection

The SE0X7GD2X allows optical fibre cable connection; the SE0X7GD1X, SE0X7GQ1X and SE0X7GQ2X allow twisted pair cable connection. See the section "[Chapter 2 Gigabit Ethernet Card Installation](#)" for detailed information.

- LEDs

The LEDs of the Gigabit Ethernet cards are listed in "[Table 1.3 LEDs](#)". See "[Appendix B Gigabit Ethernet Card LED Diagnosis](#)" for detailed information.

Table 1.3 LEDs

Gigabit Ethernet cards	LEDs
SE0X7GD2X(1000BASE-SX)	Two LEDs per port: LINK LED, ACT LED
SE0X7GD1X(10/100/1000BASE-T)	Three LEDs per port: 1000M LED, 100M LED, LINK/ACT LED
SE0X7GQ1X SE0X7GQ2X (10/100/1000BASE-T)	Two LEDs per port: LINK LED, ACT LED

Figure 1.1 1000Base-SX * 2ports (SE0X7GD2X)

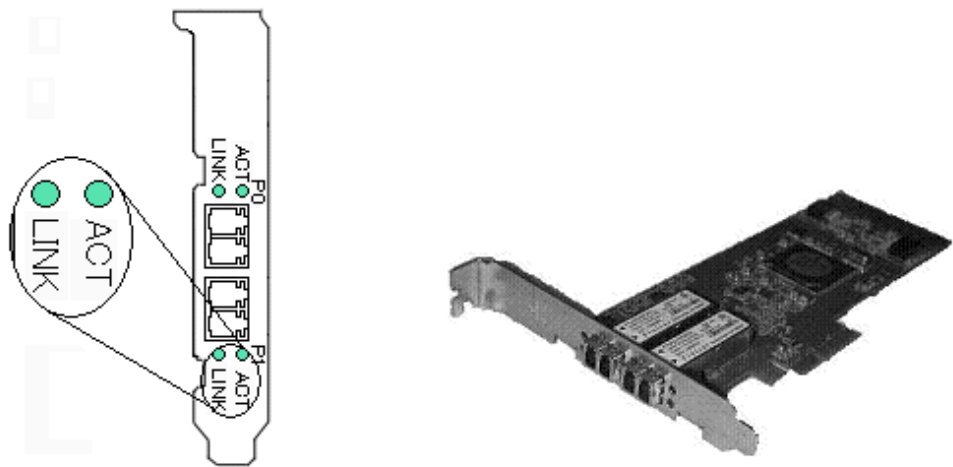


Figure 1.2 10/100/1000Base-T * 2ports (SE0X7GD1X)

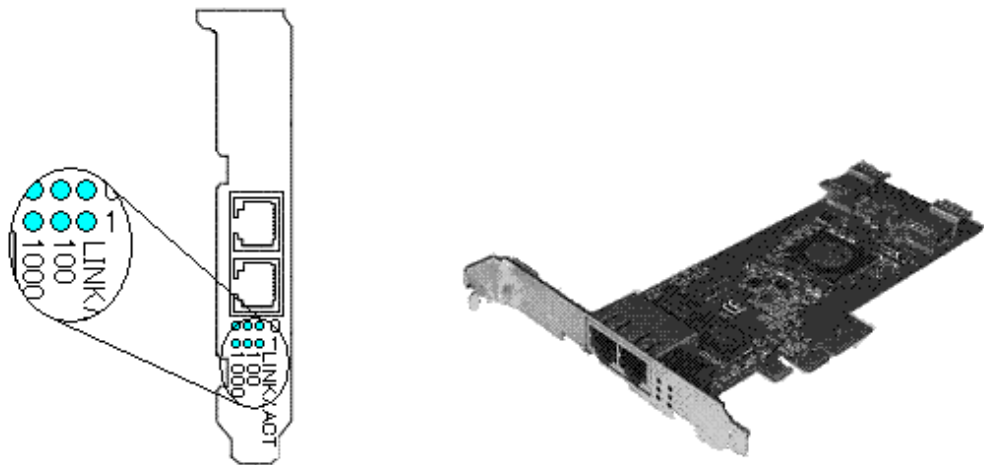


Figure 1.3 10/100/1000Base-T * 4ports (SE0X7GQ1X)

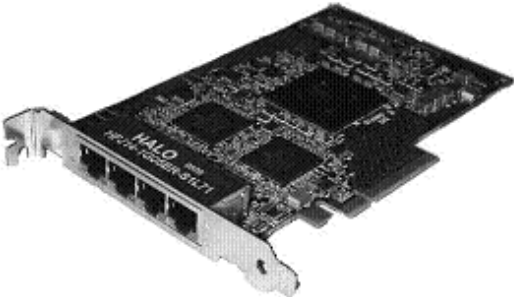
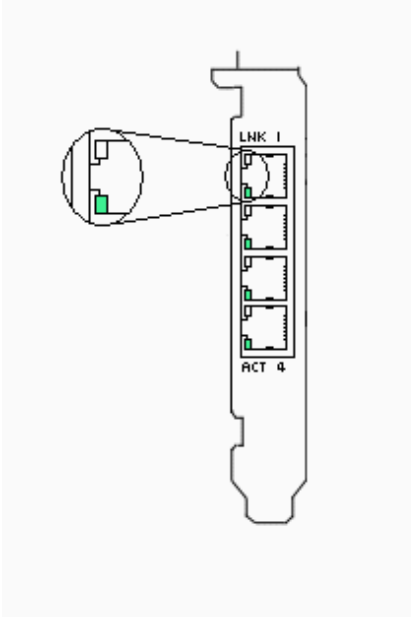
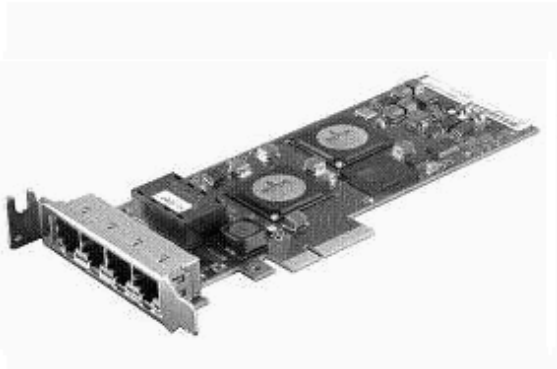
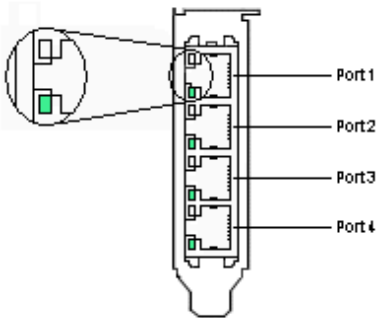


Figure 1.4 10/100/1000Base-T * 4ports (SE0X7GQ2X)



Chapter 2 Gigabit Ethernet Card Installation

This chapter describes the tasks necessary to install this card in your system.
Install the hardware with the following procedures.

- [2.1 Installation of the Gigabit Ethernet Card](#)
- [2.2 Identifying the Gigabit Ethernet Card](#)
- [2.3 Cable Connection](#)

2.1 Installation of the Gigabit Ethernet Card

Insert the card into a PCI Express slot on your server.
Please refer to the User's Manual of your server for details about installing cards and specific PCI Express slot specifications.

Information

- Even when the system works, the device can be dynamically installed by the PCI hot plug feature of Solaris (*1) if the server is one of the SPARC Enterprise M4000/M5000/M8000/M9000. The device can be dynamically composed by executing the `cfgadm(1M)` command or `hotplug(1M)` command (Solaris 10 9/10 or later). For more information, refer to the "Service Manual" of your server, System Administration Guide:Basic Administration" of the Oracle Documentation and the "man pages section 1M:System Administration Commands" of the Oracle Documentation.

*1: The PCI hot plug feature of Solaris is a feature that can be physically installed, detached or exchange the device while the system is working.

2.2 Identifying the Gigabit Ethernet Card

The Gigabit Ethernet card can be identified by executing the "`boot -r`" command at the `ok` prompt after installing it into the server.

```
ok boot -r
```

Information

- Also, even when the system works, the device can be dynamically identified by the PCI hot plug feature of Solaris if the server is one of the SPARC Enterprise M4000/M5000/M8000/M9000. The device can be dynamically composed by executing the `cfgadm(1M)` command or `hotplug(1M)` command (Solaris 10 9/10 or later). For more information, refer to the "Service Manual" of your server, System Administration Guide:Basic Administration" of the Oracle Documentation and the "man pages section 1M:System Administration Commands" of the Oracle Documentation.

2.3 Cable Connection

Figure 2.1 to 2.4 shows how to connect a cable to the Gigabit Ethernet card.

Connect a multimode optical fiber cable to the connector of the SE0X7GD2X Gigabit Ethernet card.

Connect a CAT5e (Enhanced Category 5) twisted pair cable to the connector of the SE0X7GD1X, SE0X7GQ1X and SE0X7GQ2X Gigabit Ethernet cards.

Figure 2.1 SE0X7GD2X (with Multimode Optical Fiber Cable)

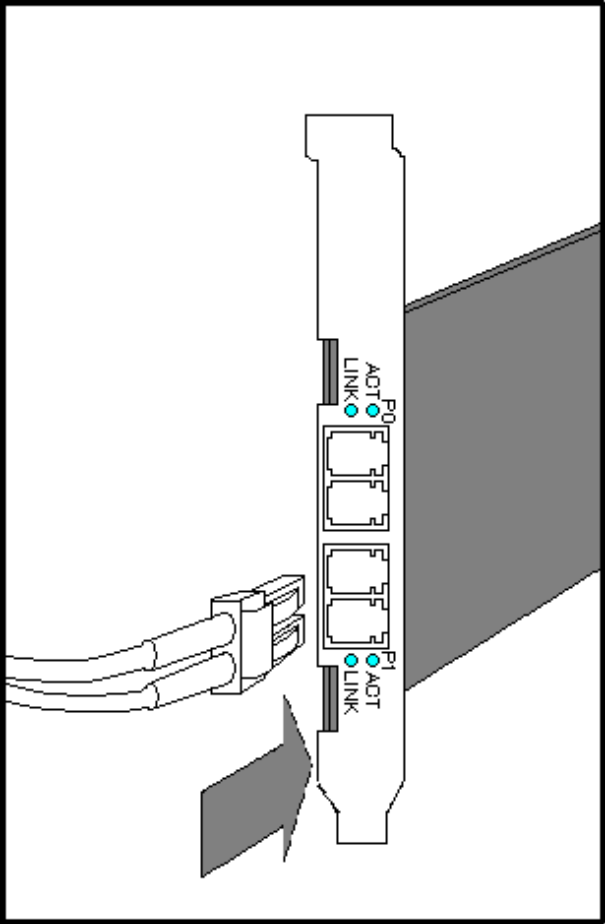


Figure 2.2 SE0X7GD1X (with Twisted Pair CAT5e Cable)

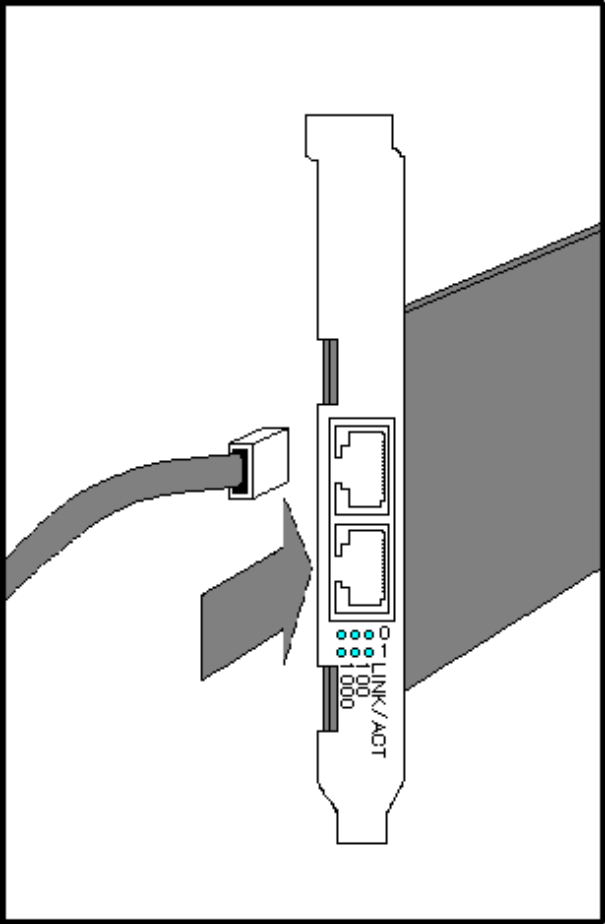


Figure 2.3 SE0X7GQ1X (with Twisted Pair CAT5e Cable)

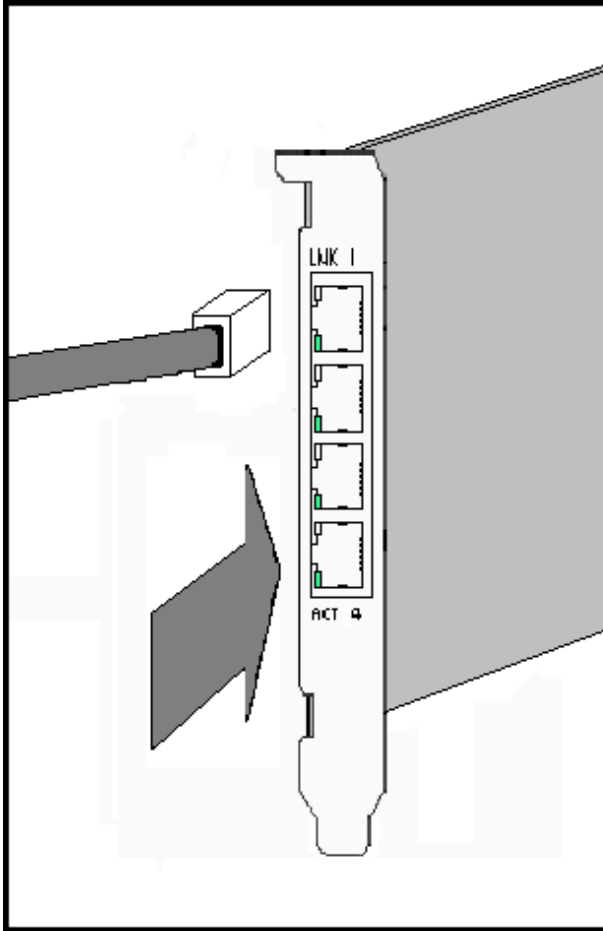
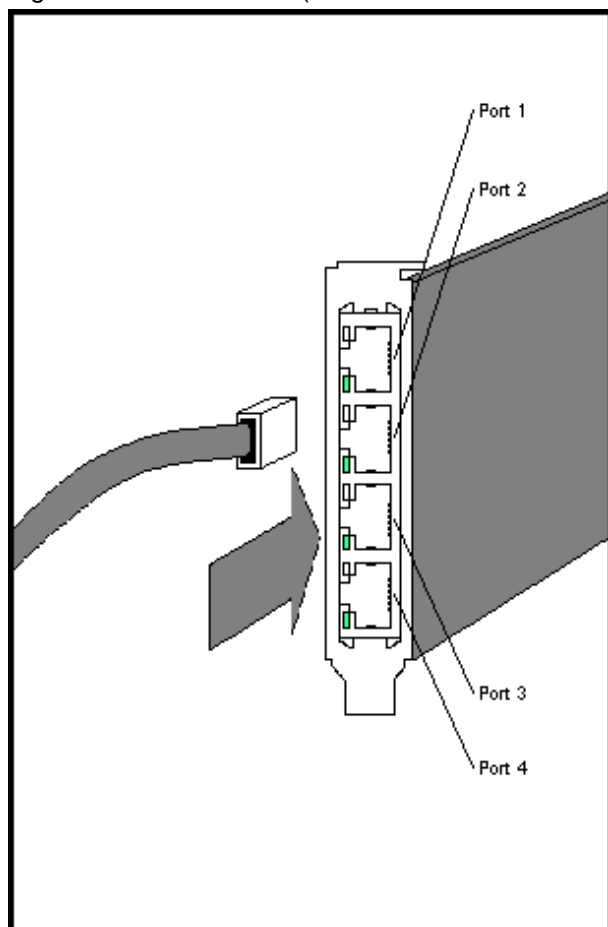


Figure 2.4 SE0X7GQ2X (with Twisted Pair CAT5e Cable)



Chapter 3 Setting Instructions

This chapter describes the summary of environment settings required after installing this product.
Install the driver and configure environment settings using the following procedures.

- [3.1 Driver Software Installation](#)
- [3.2 Identification of Interface Name](#)
- [3.2 Identification of Interface Name](#)
- [3.3 Environment Setting](#)
- [3.5 Operation Mode Setup](#)
- [3.6 Network Installation](#)
- [3.7 VLAN Interface Setup](#)

3.1 Driver Software Installation

It is necessary to install the driver software stored on the CD-ROM that ships with the card to use this product. See the document "Installation Guide FUJITSU PCI GigabitEthernet 4.1 Update2 / 5.0" for installation procedures.

3.2 Identification of Interface Name

In Solaris 11, The interface name is changed into the form of "net*" from the form of "fjgi*" by Vanity Naming.

This section explains how to identify the interface name of fjgi interface.

1: Please put a decimal number (instance number) in place of the asterisk ().

See section "[3.3 Environment Setting](#)" for detailed information about instance number.

Execute the commands shown in the following examples.

```
dladm show-phys | grep fjgi
```

example:

```
# dladm show-phys | grep fjgi
net2          Ethernet          unknown    1000      unknown   fjgi0
net3          Ethernet          unknown    1000      unknown   fjgi1
net4          Ethernet          unknown    1000      unknown   fjgi2
net5          Ethernet          unknown    1000      unknown   fjgi3
```

The installed fjgi interface and the interface name are displayed.

The interface name (Vanity Name, the form of "net*")	fjgi interface (the form of "fjgi*")
net2	fjgi0
net3	fjgi1
net4	fjgi2
net5	fjgi3

In the above example, it is displayed that net2 is fjgi0, net3 is fjgi1, and net5 is fjgi3.

In addition, The interface name can be changed by dladm rename-link command. For more information about the dladm(1M) command, please refer to the "System Administration Guide: IP Services" and the "man pages section 1M: System Administration Commands" of Oracle Documentation.

3.3 Environment Setting

This section explains how to edit the necessary files and use the commands(Solaris 11 only) to configure the operating environment for each FUJITSU PCI GigabitEthernet interface.

For TCP/IP (IPv4 or IPv6), edit the following files and execute the following command(Solaris 11 only).

- **Solaris 10 8/07 or later**

- /etc/hostname.fjgi*(*1) file
- /etc/inet/hosts file or /etc/inet/ipnodes file
- /etc/inet/netmasks file

1: Please put a decimal number (instance number) in place of the asterisk ().

See section "3.3 Environment Setting" for detailed information about instance number.

- **Solaris 11**

- ipadm(1M) command
- /etc/hosts file

*1: For more information about the ipadm(1M) command, please refer to the "System Administration Guide: IP Services" and the "man pages section 1M: System Administration Commands" of Oracle Documentation.

3.3.1 Environment Setting of IPv4 Interfaces

- **Solaris 10 8/07 or later**

1. Edit the /etc/hostname.fjgi* file

Assign an IP address or hostname to the fjgi interface by editing the /etc/hostname.fjgi* file (where *fjgi** represents the driver name and instance number).

The relationship between IP address and netmask needs to be defined using the procedure described in "3. Edit the /etc/inet/netmasks file".

Example of the /etc/hostname.fjgi* file:

Define a unique hostname (example: giga-v4). (*1)

giga-v4

Or define an IP address (example: 192.168.150.1). (*2)

192.168.150.1

*1: See section "2. Edit the /etc/inet/hosts file" for detailed information about defining the hostname.

*2: Please put neither a blank nor an empty line behind the hostname or IP address. If a blank or an empty line has been entered, the fjgj driver will not be activated during OS boot.

2. Edit the /etc/inet/hosts file

Define an IP address by a unique name. Describe the relationship between the IP address and hostname in the /etc/inet/hosts file.

Example of the /etc/inet/hosts file:

Describe the relationship between an IP address (example: 192.168.150.1) and a hostname (example: giga-v4).

# IP Address	Hostname
192.168.150.1	giga-v4

3. Edit the /etc/inet/netmasks file

Describe the relationship between the network address and the netmask in the /etc/inet/netmasks file.

Example of the /etc/inet/netmasks file:

Describe the relationship between the network address (example: 192.168.150.0) and the netmask (example: 255.255.255.0).

# Network Address	netmask
192.168.150.0	255.255.255.0

4. Reboot the system

Reboot the system after editing the above files.

- Solaris 11

1. How to Use the ipadm(1M) Command

Assign an IP address or hostname and prefix length to the fjgi interface by ipadm(1M) command.

Example:

Setup a unique hostname (example: giga-v4) and prefix length (example: 24) to fjgi interface (example: fjgi0 (this vanity name is net2)). (*1)

ipadm create-ip net2
ipadm create-addr -T static -a giga-v4/24 net2/v4static

Or setup an IP address (example: 192.168.150.1) and prefix length (example: 24) to fjgi interface (example: fjgi0 (this vanity name is net2)).

ipadm create-ip net2
ipadm create-addr -T static -a 192.168.150.1/24 net2/v4static

*1: When you use a hostname, please see section "2. Edit the /etc/hosts file" first.



Information

- The following examples show how to display an IP address and prefix length that assigned the fjgi interface.

Example:

When setting an IP address (example: 192.168.150.1) and prefix length (example: 24) to fjgi interface (example: fjgi0 (this vanity name is net2)).

# ipadm show-addr net2/v4static			
ADDROBJ	TYPE	STATE	ADDR
net2/v4static	static	ok	192.168.150.1/24

2. Edit the /etc/hosts file

Define an IP address by a unique name. Describe the relationship between the IP address and hostname in the /etc/hosts file.

Example of the /etc/inet/hosts file:

Describe the relationship between an IP address (example: 192.168.150.1) and a hostname (example: giga-v4).

# IP Address	Hostname
192.168.150.1	giga-v4

3.3.2 Environment Setting of IPv6 Interfaces

- Solaris 10 8/07 or later

1. Edit the /etc/hostname6.fjgi* file

Assign an IPv6 address or hostname and prefix length to the fjgi interface by editing the /etc/hostname6.fjgi* file (where *fjgi** represents the driver name and instance number).

Example of the /etc/hostname6.fjgi* file:

Define a unique hostname (example: giga-v6) and prefix length (example: 120). (*1)

```
addif giga-v6/120 up
```

Or define an IPv6 address (example: fe80::2e0:ff:fea6:2222) and prefix length (example: 120).

```
addif fe80::2e0:ff:fea6:2222/120 up
```

1: See section "2. Edit the /etc/inet/ipnodes file" when you define a hostname in the /etc/hostname6.fjgi file.

2. Edit the /etc/inet/ipnodes file

Define an IPv6 address by a unique name. Describe the relationship between the IPv6 address and the hostname in the /etc/inet/ipnodes file.

Example of the /etc/inet/ipnodes file:

Describe the relationship between the IPv6 address (example: fe80::2e0:ff:fea6:2222) and the hostname (example: giga-v6).

```
# IP Address      Hostname
fe80::2e0:ff:fea6:2222  giga-v6
```

3. Reboot the system

Reboot the system after editing the above files.

- Solaris 11

1. How to Use the ipadm(1M) Command

Assign an IP address or hostname and prefix length to the fjgi interface by ipadm(1M) command.

Example:

Setup a unique hostname (example: giga-v6) and prefix length (example: 120) to fjgi interface (example: fjgi0 (this vanity name is net2)). (*1)

```
# ipadm create-ip net2
# ipadm create-addr -T addrconf net2/v6addrconf
# ipadm create-addr -T static -a giga-v6/24 net2/v4static
```

Or setup an IP address (example: fe80::2e0:ff:fea6:2222) and prefix length (example: 120) to fjgi interface (example: fjgi0 (this vanity name is net2)).

```
# ipadm create-ip net2
# ipadm create-addr -T addrconf net2/v6addrconf
# ipadm create-addr -T static -a fe80::2e0:ff:fea6:2222/120 net2/v6static
```

*1: When you use a hostname, please see section "2. Edit the /etc/hosts file" first.

Information

- The following example shows how to display an IP address and prefix length that assigned the fjgi interface.

Example:

When setting an IP address (example: 192.168.150.1) and prefix length (example: 24) to fjgi interface (example: fjgi0 (this vanity name is net2)).

```
# ipadm show-addr net2/v4static
ADDROBJ      TYPE      STATE      ADDR
net2/v6static  static    ok         fe80::2e0:ff:fea6:2222/120
```

2. Edit the /etc/hosts file

Define an IPv6 address by a unique name. Describe the relationship between the IPv6 address and the hostname in the /etc/inet/ipnodes file.

Example of the /etc/hosts file:

Describe the relationship between the IPv6 address (example: fe80::2e0:ff:fea6:2222) and the hostname (example: giga-v6).

```
# IP Address      Hostname
fe80::2e0:ff:fea6:2222  giga-v6
```

Information

- In Solaris 10 8/07 or later, to delete the environment settings, please delete each of the settings made in the procedures described in "[3.3.1 Environment Setting of IPv4 Interfaces](#)" and "[3.3.2 Environment Setting of IPv6 Interfaces](#)" from the files.
- In Solaris 11, to delete the environment settings, please execute the following ipadm(1M) command and delete each of the settings made in the procedures described in "[3.3.1 Environment Setting of IPv4 Interfaces](#)" and "[3.3.2 Environment Setting of IPv6 Interfaces](#)" from the files.

Example:

```
# ipadm delete-ip net2
```

- To use VLAN interfaces, please refer first to "[3.7.2 Setting Up the VLAN Interface](#)" to define the interface name. Then, please carry out the procedures described in "[3.3.1 Environment Setting of IPv4 Interfaces](#)" or "[3.3.2 Environment Setting of IPv6 Interfaces](#)".

3.4 Identification of the Gigabit Ethernet Card

This section explains how to identify a slot in which the Gigabit Ethernet card has been installed, on SPARC Enterprise.

Execute the commands shown in the following examples.

- Identification of the Gigabit Ethernet Card Types and Instance Number

```
prtconf -D | grep fjgi
```

example:

```
# prtconf -D | grep fjgi
FJSV,e4ta, instance #0 (driver name: fjgi)
FJSV,e4ta, instance #1 (driver name: fjgi)
FJSV,e4ta, instance #2 (driver name: fjgi)
FJSV,e4ta, instance #3 (driver name: fjgi)
FJSV,e2sa, instance #4 (driver name: fjgi)
FJSV,e2sa, instance #5 (driver name: fjgi)
```

```
FJSV,e2ta, instance #6 (driver name: fjgi)
FJSV,e2ta, instance #7 (driver name: fjgi)
FJSV,e4tb, instance #8 (driver name: fjgi)
FJSV,e4tb, instance #9 (driver name: fjgi)
FJSV,e4tb, instance #10 (driver name: fjgi)
FJSV,e4tb, instance #11 (driver name: fjgi)
```

The installed Gigabit Ethernet card types and instance numbers (shown in **bold**, above) are displayed.

Gigabit Ethernet card types:

FJSV,e4ta	SE0X7GQ1X (10/100/1000Base-T * 4ports) card
FJSV,e2sa	SE0X7GD2X (1000BASE-SX * 2ports) card
FJSV,e2ta	SE0X7GD1X (10/100/1000BASE-T * 2ports) card
FJSV,e4tb	SE0X7GQ2X (10/100/1000BASE-T * 4ports) card

In this example, the following types of installed Gigabit Ethernet cards can be identified: e4ta (SE0X7GQ1X), e2sa (SE0X7GD2X), e2ta (SE0X7GD1X) and e4tb (SE0X7GQ2X).

Instance numbers:

In this example, the following instance numbers of installed Gigabit Ethernet cards can be identified:

```
e4ta: 0, 1, 2, 3
e2sa: 4, 5
e2ta: 6, 7
e4tb: 8, 9, 10, 11
```

- Identification of Slots with Installed Gigabit Ethernet Cards

```
more /etc/path_to_inst | grep fjgi
```

example:

```
# more /etc/path_to_inst | grep fjgi
"/pci@1,700000/pci@0/FJSV,e4ta@4" 0 "fjgi"
"/pci@1,700000/pci@0/FJSV,e4ta@4,1" 1 "fjgi"
"/pci@1,700000/pci@0,1/FJSV,e4ta@6" 2 "fjgi"
"/pci@1,700000/pci@0,1/FJSV,e4ta@6,1" 3 "fjgi"
"/pci@2,600000/pci@0/FJSV,e2sa@4" 4 "fjgi"
"/pci@2,600000/pci@0/FJSV,e2sa@4,1" 5 "fjgi"
"/pci@3,700000/pci@0/FJSV,e2ta@4" 6 "fjgi"
"/pci@3,700000/pci@0/FJSV,e2ta@4,1" 7 "fjgi"
"/pci@4,600000/pci@0/FJSV,e4tb@4" 8 "fjgi"
"/pci@4,600000/pci@0/FJSV,e4tb@4,1" 9 "fjgi"
"/pci@4,600000/pci@0,1/FJSV,e4tb@6" 10 "fjgi"
"/pci@4,600000/pci@0,1/FJSV,e4tb@6,1" 11 "fjgi"
```

The installed logical bus addresses and the instance numbers (shown in **bold**, above) are displayed.

Identification of the logical bus addresses, instance numbers and driver name for each interface:

Logical bus address	Instance number	Driver name
"/pci@1,700000/pci@0/FJSV,e4ta@4"	0	fjgi
"/pci@1,700000/pci@0/FJSV,e4ta@4,1"	1	fjgi
"/pci@1,700000/pci@0,1/FJSV,e4ta@6"	2	fjgi

Logical bus address	Instance number	Driver name
"/pci@1,700000/pci@0,1/FJSV,e4ta@6,1"	3	fjgi
"/pci@3,700000/pci@0/FJSV,e2sa@4"	4	fjgi
"/pci@3,700000/pci@0/FJSV,e2sa@4,1"	5	fjgi
"/pci@2,600000/pci@0/FJSV,e2ta@4"	6	fjgi
"/pci@2,600000/pci@0/FJSV,e2ta@4,1"	7	fjgi
"/pci@4,600000/pci@0/FJSV,e4tb@4"	8	fjgi
"/pci@4,600000/pci@0/FJSV,e4tb@4,1"	9	fjgi
"/pci@4,600000/pci@0,1/FJSV,e4tb@6"	10	fjgi
"/pci@4,600000/pci@0,1/FJSV,e4tb@6,1"	11	fjgi

The relationship of logical bus addresses to physical slot numbers differs in each server. To determine the relationship, please refer to ["Appendix G PCI Slot Number and Device Name"](#).

3.5 Operation Mode Setup

This section explains how to edit the fjgi.conf configuration file or use the command line to change the operation mode of FUJITSU PCI GigabitEthernet interfaces. Setup of the following operation modes are described below.

- [3.5.1 Setting the fjgi.conf File](#)
- [3.5.2 JumboFrame Setup](#)
- [3.5.3 Using the ndd\(1M\) command](#)
- [3.5.4 Using the dladm\(1M\) command](#)
- [3.5.5 FCode Settings](#)

3.5.1 Setting the fjgi.conf File

Usually, setup of the fjgi.conf file is unnecessary. Default settings are appropriate in most environments.

The following examples show cases when the fjgi.conf file needs to be modified.

Example:

- When the remote device does not support Auto-Negotiation.
In this case, please set the same mode of operation for the local and remote devices.
- When Auto-Negotiation is used, but it is desirable to use a specific setting value, different from the default value (for example, when you want to set the speed to 100Mbps in order to keep the CPU load by the network low).
- When JumboFrame is used.
For details, please refer to ["3.5.2 JumboFrame Setup"](#).

Using Auto-Negotiation (the default settings) is recommended for speed, duplex, and flow control.

To change the operation mode, there are two methods; "Method 1: Setting method of new style" and "Method 2: Setting method of old style". When there is a mistake in parent and unit-address setting by the "Method 2", warning messages may be displayed repeatedly. Therefore the "Method 1: Setting method of new style" is recommended.

When editing the fjgi.conf file, please review the [Cautions] in the following sections.

- Method 1: Setting method of new style (Recommended)

[Parameter List]

Parameter	Value	Description
LinkSpeed_A (*1)	Auto (default)	Any connection speed of 1000, 100, or 10 Mbps is set based on negotiation with the remote device. (This is effective only when AutoNegotiation_A=On.)
	1000	Connect at 1000Mbps.
	100	Connect at 100Mbps.
	10	Connect at 10Mbps.
DuplexCapabilities_A (*1)	Both (default)	Both Full-Duplex and Half-Duplex are enabled. (This is effective only when AutoNegotiation_A=On.)
	Half	Half-Duplex operation is enabled.
	Full	Full-Duplex operation is enabled.
FlowControl_A (*2)	Auto (default)	Flow control is performed according to the setup of the remote device.
	Rem	Only flow control from the remote device is allowed. Flow control from the local device is not allowed.
	LocSend	Only flow control from the local device is allowed. Flow control from the remote device is not allowed.
	None	Flow control is disabled.
fjgi_mtu	1500 (default) to 9000 (*3)	MTU (byte) is specified.
AutoNegotiation_A	On (default)	Auto-Negotiation is enabled. The interface will not be able to communicate with remote device operating in fixed mode (Auto-Negotiation disabled). When SE0X7GD1X, SE0X7GQ1X, SE0X7GQ2X is used in 1000Mbps mode, use this setting.
	Off	Auto-Negotiation is disabled. (Forced mode)
Role_A (*4)	Auto (default)	Master or Slave is set based on negotiation with the remote device. (This is effective only when AutoNegotiation_A= On.)
	Master	Communication by Master.
	Slave	Communication by Slave.
ReceiveTicks	0 to 1000 (*3) (default: 77)	Time to wait for an interrupt for receiving is specified (micro seconds). (*5)
TransmitTicks	0 to 1000 (*3) (default: 500)	Time to wait for an interrupt for transmitting is specified (micro seconds). (*5)
ReceiveMaxBD	1 to 500 (*3) (default: 10)	The number of buffer descriptor to wait for an interrupt for receiving is specified. (*5)

Parameter	Value	Description
TransmitMaxBD	1 to 500 (*3) (default: 128)	The number of buffer descriptor to wait for an interrupt for transmitting is specified. (*5)
fjgi* (*6)	<LinkSpeed_A> :<DuplexCapabilities_A> :<FlowControl_A> :<fjgi_mtu> :<AutoNegotiation_A> :<Role_A> :<ReceiveTicks> :<TransmitTicks> :<ReceiveMaxBD> :<TransmitMaxBD> (*7)	Parameter setting values are specified for every instance. Refer to the description of each parameter for the meaning of each value.

*1: Parameter is supported on 10/100/1000Base-T (SE0X7GD1X, SE0X7GQ1X, SE0X7GQ2X) adapters only.

*2: Parameter is effective only when AutoNegotiation_A=On. When AutoNegotiation_A=Off, it becomes FlowControl_A=None.

*3: Specify the value as a decimal figure.

*4: Parameter is supported on 10/100/1000Base-T (SE0X7GD1X, SE0X7GQ1X, SE0X7GQ2X) adapters in 1000Mbps mode only.

*5: These ReceiveTicks, TransmitTicks, ReceiveMaxBD or TransmitMaxBD parameters are tuning parameters about the performance.

6: Please put a decimal number (instance number) in place of the asterisk ().

The fjgi* parameter is used prior to parameters to all instances if the fjgi parameter is specified with LinkSpeed_A, DuplexCapabilities_A, FlowControl_A, fjgi_mtu, AutoNegotiation_A, Role_A, ReceiveTicks, TransmitTicks, ReceiveMaxBD or TransmitMaxBD parameters.

*7: The default values are used when setting values are omitted.

[Parameter Setting]

The following examples show how to set the fjgi.conf file.

- The location of the fjgi.conf file depends on the model of the host system as described below:

1. SPARC Enterprise Txxxx series and SPARC T3 series

/platform/sun4v/kernel/drv/fjgi.conf

2. SPARC Enterprise Mxxxx series

/platform/SUNW,SPARC-Enterprise/kernel/drv/fjgi.conf

- How to set a parameter to all instances

Example 1: The parameters for all instances are set to "Auto-Negotiation is disabled", "Connect at 100Mbps" and "Half-Duplex operation is enabled".

The parameter values need to be set by character strings like AutoNegotiation_A="Off", LinkSpeed_A="100" and DuplexCapabilities_A="Half".

The following is added to the fjgi.conf file:

```
AutoNegotiation_A="Off"
LinkSpeed_A="100"
DuplexCapabilities_A="Half";
```

Example 2: The parameters for all instances are set to "Auto-Negotiation is enabled", "Connect at 100Mbps" and "Full-Duplex operation is enabled".

The parameter values need to be set by character strings like `AutoNegotiation_A="On"`, `LinkSpeed_A="100"` and `DuplexCapabilities_A="Full"`.

The following is added to the `fjgi.conf` file:

```
AutoNegotiation_A="On"  
LinkSpeed_A="100"  
DuplexCapabilities_A="Full";
```

Example 3: The MTU parameter for all instances is set to 8000.

The parameter value needs to be set by numerical value like `fjgi_mtu=8000`.

The following is added to the `fjgi.conf` file:

```
fjgi_mtu=8000;
```

Note: After making changes to the `fjgi.conf` file, the system must be rebooted. The settings become effective after rebooting.

- How to set a parameter to each instance

Example 1: The parameters for `fjgi0` is set to "Auto-Negotiation is disabled", "Connect at 100Mbps" and "Half-Duplex operation is enabled".

The parameter value needs to be set by a character string like `fjgi0="100:Half::Off::::"`.

The following is added to the `fjgi.conf` file:

```
fjgi0="100:Half::Off::::";
```

Example 2: The parameters for `fjgi1` is set to "Auto-Negotiation is disabled", "Connect at 100Mbps" and "Half-Duplex operation is enabled".

The parameter value needs to be set by a character string like `fjgi1="100:Half:Auto:1500:Off:Auto::::"`.

The following is added to the `fjgi.conf` file:

```
fjgi1="100:Half:Auto:1500:Off:Auto::::";
```

Example 3: The parameters for `fjgi0` is set to "Auto-Negotiation is enabled", "Connect at 100Mbps" and "Full-Duplex operation is enabled".

The parameter value needs to be set by a character string like `fjgi0="100:Full::On::::"`.

The following is added to the `fjgi.conf` file:

```
fjgi0="100:Full::On::::";
```

Example 4: The parameters for `fjgi1` is set to "Auto-Negotiation is enabled", "Connect at 100Mbps" and "Full-Duplex operation is enabled".

The parameter value needs to be set by a character string like `fjgi1="100:Full:Auto:1500:On:Auto::::"`.

The following is added to the `fjgi.conf` file:

```
fjgi1="100:Full:Auto:1500:On:Auto::::";
```

Example 5: The MTU parameter for `fjgi0` is set to 8000.

The parameter value needs to be set by a character string like `fjgi0=":::8000:....."`.

The following is added to the `fjgi.conf` file:

```
fjgi0=":::8000:.....";
```

Example 6: The MTU parameter for `fjgi1` is set to 8000.

The parameter value needs to be set by a character string like `fjgi1="Auto:Both:Auto:8000:On:Auto:::"`.

The following is added to the `fjgi.conf` file:

```
fjgi1="Auto:Both:Auto:8000:On:Auto:::";
```

Note: After making changes to the `fjgi.conf` file, the system must be rebooted. The settings become effective after rebooting.

- How to set parameters to all instances and to each instance

Example 1: The MTU parameter for all instances is set to 1500 and the MTU parameter for `fjgi0` is set to 8000.

In this case, the MTU of `fjgi0` is 8000, and the MTU of other instances is 1500.

The following is added to the `fjgi.conf` file:

```
fjgi_mtu=1500;  
fjgi0=":::8000:.....";
```

Note: After making changes to the `fjgi.conf` file, the system must be rebooted. The settings become effective after rebooting.

- Method 2: Setting method of old style

[Parameter List]

Parameter	Value	Description
name	fjgi	Used to specify the driver name.
parent	See below	Used to specify the location of the device node in the device tree.
unit-address	See below	Used to specify the address within the device node.
LinkSpeed_A (*1)	Auto (default)	Any connection speed of 1000, 100, or 10 Mbps is set based on negotiation with the remote device. (This is effective only when <code>AutoNegotiation_A=On</code> .)
	1000	Connect at 1000Mbps.
	100	Connect at 100Mbps.
	10	Connect at 10Mbps.
DuplexCapabilities_A (*1)	Both (default)	Both Full-Duplex and Half-Duplex are enabled. (This is effective only when <code>AutoNegotiation_A=On</code> .)
	Half	Half-Duplex operation is enabled.
	Full	Full-Duplex operation is enabled.
FlowControl_A (*2)	Auto (default)	Flow control is performed according to the setup of the remote device.

Parameter	Value	Description
	Rem	Only flow control from the remote device is allowed. Flow control from the local device is not allowed.
	LocSend	Only flow control from the local device is allowed. Flow control from the remote device is not allowed.
	None	Flow control is disabled.
fjgi_mtu	1500 (default) to 9000 (*3)	MTU (byte) is specified.
AutoNegotiation_A	On (default)	Auto-Negotiation is enabled. The interface will not be able to communicate with remote device operating in fixed mode (Auto-Negotiation disabled). When SE0X7GD1X, SE0X7GQ1X, SE0X7GQ2X is used in 1000Mbps mode, use this setting.
	Off	Auto-Negotiation is disabled. (Forced mode)
Role_A (*4)	Auto (default)	Master or Slave is set based on negotiation with the remote device. (This is effective only when AutoNegotiation_A= On.)
	Master	Communication by Master.
	Slave	Communication by Slave.
ReceiveTicks	0 to 1000 (*3) (default: 77)	Time to wait for an interrupt for receiving is specified (micro seconds). (*5)
TransmitTicks	0 to 1000 (*3) (default: 500)	Time to wait for an interrupt for transmitting is specified (micro seconds). (*5)
ReceiveMaxBD	1 to 500 (*3) (default: 10)	The number of buffer descriptor to wait for an interrupt for receiving is specified. (*5)
TransmitMaxBD	1 to 500 (*3) (default: 128)	The number of buffer descriptor to wait for an interrupt for transmitting is specified. (*5)

*1: Parameter is supported on 10/100/1000Base-T (SE0X7GD1X, SE0X7GQ1X, SE0X7GQ2X) adapters only.

*2: Parameter is effective only when AutoNegotiation_A=On. When AutoNegotiation_A=Off, it becomes FlowControl_A=None.

*3: Specify the value as a decimal figure.

*4: Parameter is supported on 10/100/1000Base-T (SE0X7GD1X, SE0X7GQ1X, SE0X7GQ2X) adapters in 1000Mbps mode only.

*5: These ReceiveTicks, TransmitTicks, ReceiveMaxBD or TransmitMaxBD parameters are tuning parameters about the performance.

[Parameter Setting]

The following shows how to set the parent and unit-address parameters in the fjgi.conf file.

- Find the fjgi device tree, device node and instance number in the /etc/path_to_inst file.

Example:

```
# grep fjgi /etc/path_to_inst
```

```
"/pci@1,700000/pci@0/FJSV,e4ta@4" 0 "fjgi"
"/pci@1,700000/pci@0/FJSV,e4ta@4,1" 1 "fjgi"
"/pci@1,700000/pci@0,1/FJSV,e4ta@6" 2 "fjgi"
"/pci@1,700000/pci@0,1/FJSV,e4ta@6,1" 3 "fjgi"
"/pci@2,600000/pci@0/FJSV,e2sa@4" 4 "fjgi"
"/pci@2,600000/pci@0/FJSV,e2sa@4,1" 5 "fjgi"
"/pci@3,700000/pci@0/FJSV,e2ta@4" 6 "fjgi"
"/pci@3,700000/pci@0/FJSV,e2ta@4,1" 7 "fjgi"
"/pci@4,600000/pci@0/FJSV,e4tb@4" 8 "fjgi"
"/pci@4,600000/pci@0/FJSV,e4tb@4,1" 9 "fjgi"
"/pci@4,600000/pci@0,1/FJSV,e4tb@6" 10 "fjgi"
"/pci@4,600000/pci@0,1/FJSV,e4tb@6,1" 11 "fjgi"
```

SE0X7GQ1X

SE0X7GD2X

SE0X7GD1X

SE0X7GQ2X

- From the above example, instance number and driver name for each interface can be determined.

Device node of device tree	Instance number	Driver name
/pci@1,700000/pci@0/FJSV,e4ta@4	0	fjgi
/pci@1,700000/pci@0/FJSV,e4ta@4,1	1	fjgi
/pci@1,700000/pci@0,1/FJSV,e4ta@6	2	fjgi
/pci@1,700000/pci@0,1/FJSV,e4ta@6,1	3	fjgi
/pci@2,600000/pci@0/FJSV,e2sa@4	4	fjgi
/pci@2,600000/pci@0/FJSV,e2sa@4,1	5	fjgi
/pci@3,700000/pci@0/FJSV,e2ta@4	6	fjgi
/pci@3,700000/pci@0/FJSV,e2ta@4,1	7	fjgi
/pci@4,600000/pci@0/FJSV,e4tb@4	8	fjgi
/pci@4,600000/pci@0/FJSV,e4tb@4,1	9	fjgi
/pci@4,600000/pci@0,1/FJSV,e4tb@6	10	fjgi
/pci@4,600000/pci@0,1/FJSV,e4tb@6,1	11	fjgi

- The parent and unit-addresses from the example are shown below. The parent is the character string to the left of FJSV,e4ta@, FJSV,e2sa@, FJSV,e2ta@, or FJSV,e4tb@. The unit-address is the number to the right of FJSV,e4ta@, FJSV,e2sa@, FJSV,e2ta@, or FJSV,e4tb@.

	SE0X7GQ1X	
name	fjgi	
parent	/pci@1,700000/pci@0	/pci@1,700000/pci@0,1
unit-address	instance 0 is 4 instance 1 is 4,1	instance 2 is 6 instance 3 is 6,1

	SE0X7GD2X	
name	fjgi	
parent	/pci@2,600000/pci@0	
unit-address	instance 4 is 4 instance 5 is 4,1	

	SE0X7GD1X
name	fjgi
parent	/pci@3,700000/pci@0
unit-address	instance 6 is 4 instance 7 is 4,1

	SE0X7GQ2X	
name	fjgi	
parent	/pci@4,600000/pci@0	/pci@4,600000/pci@0,1
unit-address	instance 8 is 4 instance 9 is 4,1	instance 10 is 6 instance 11 is 6,1

- The location of the fjgi.conf file depends on the model of the host system as described below:

1. SPARC Enterprise Txxxx series and SPARC T3 series

/platform/sun4v/kernel/drv/fjgi.conf

2. SPARC Enterprise Mxxxx series

/platform/SUNW,SPARC-Enterprise/kernel/drv/fjgi.conf

- Examples of setting parameters in the fjgi.conf file are shown below.

Example 1: The parameters for fjgi0 (the instance number 0 port of SE0X7GQ1X (10/100/1000BASE-T)) is set to "Auto-Negotiation is disabled", "Connect at 100Mbps" and "Half-Duplex operation is enabled".

The parameter values need to be set by a character string like name="fjgi", parent="/pci@1,700000/pci@0", unit-address="4", AutoNegotiation_A="Off", LinkSpeed_A="100", DuplexCapabilities_A="Half".

The following is added to the fjgi.conf file:

```
name="fjgi" parent="/pci@1,700000/pci@0" unit-address="4"
AutoNegotiation_A="Off" LinkSpeed_A="100" DuplexCapabilities_A="Half";
```

Example 2: The parameters for fjgi4 (the instance number 4 port of SE0X7GD2X (1000BASE-SX)) is set to "Auto-Negotiation is enabled", "Connect at 100Mbps" and "Full-Duplex operation is enabled".

The parameter values need to be set by a character string like name="fjgi", parent="/pci@2,600000/pci@0", unit-address="4", AutoNegotiation_A="On", LinkSpeed_A="100", DuplexCapabilities_A="Full".

The following is added to the fjgi.conf file:

```
name="fjgi" parent="/pci@2,600000/pci@0" unit-address="4"
AutoNegotiation_A="On" LinkSpeed_A="100" DuplexCapabilities_A="Full";
```

Example 3: The MTU parameter for fjgi9 (the instance number 9 port of SE0X7GQ2X (10/100/1000BASE-T)) is set to 8000.

The parameter value needs to be set by numerical value like fjgi_mtu=8000.

The following is added to the fjgi.conf file:

```
name="fjgi" parent="/pci@4,600000/pci@0" unit-address="4,1"
fjgi_mtu=8000;
```

Example 4: The parameters for all instances are set to "Auto-Negotiation is disabled", "Connect at 100Mbps" and "Half-Duplex operation is enabled".

The parameter value needs to be set by a character string like `AutoNegotiation_A="Off"`, `LinkSpeed_A="100"`, `DuplexCapabilities_A="Half"`.

The following is added to the `fjgi.conf` file:

```
AutoNegotiation_A="Off";
LinkSpeed_A="100";
DuplexCapabilities_A="Half";
```

Example 5: The parameters for all instances are set to "Auto-Negotiation is enabled", "Connect at 100Mbps" and "Full-Duplex operation is enabled".

The parameter value needs to be set by a character string like `AutoNegotiation_A="On"`, `LinkSpeed_A="100"`, `DuplexCapabilities_A="Full"`.

The following is added to the `fjgi.conf` file:

```
AutoNegotiation_A="On";
LinkSpeed_A="100";
DuplexCapabilities_A="Full";
```

Example 6: The MTU parameter for all instances is set to 8000.

The parameter value needs to be set by numerical value like `fjgi_mtu=8000`.

The following is added to the `fjgi.conf` file:

```
fjgi_mtu=8000;
```

Example 7: The MTU parameter for all instances is set to 1500 and the MTU parameter for `fjgi0` (the instance number 0 port of `SE0X7GQ1X (10/100/1000BASE-T)`) is set to 8000.

In this case, the MTU of `fjgi0` is 8000, and the MTU of other instances is 1500.

The following is added to the `fjgi.conf` file:

```
fjgi_mtu=1500;
name="fjgi" parent="/pci@1,700000/pci@0" unit-address="4" fjgi_mtu=8000;
```

Note: After making changes to the `fjgi.conf` file, the system must be rebooted. The settings become effective after rebooting.



Note

- Using Auto-Negotiation (the default setting) is recommended for speed, duplex, and flow control. When Auto-Negotiation is used, the remote device should also be setup for Auto-Negotiation. Using Auto-Negotiation on both local and remote devices allows the appropriate speed, duplex, and flow control to be set up automatically.
- When you use the `fjgi.conf` file to change the mode of operation, please set the same mode of operation on local and remote devices. When the mode of operation is not the same between local and remote devices, link up may fail, a communication error may occur (even if link is up), or the mode of operation may not be the same as specified.
- The default values of the tuning parameter which provide higher throughput are recommended for the most systems. Only when you need a smaller latency for a specific use, change the values of the parameters. You need to check if the specified parameters provide a suitable latency and throughput for your systems. When the values of these parameters are set small, the latency will be improved, but the throughput will fall.

- When "Method 1: Setting method of new style" and "Method 2: Setting method of old style" are specified at the same time, the driver gives priority to the "Method 1: Setting method of new style". And when "How to set a parameter to all instances" and "How to set a parameter to each instance" are specified at the same time, the driver gives priority to the "How to set a parameter to each instance".
- When a Gigabit Ethernet card is removed, please remove the setting parameters of the applicable adapter defined in the fjgi.conf file. If an adapter is removed and the setting parameters are left in the fjgi.conf file, a panic may occur at system boot, causing boot failure.
- Because the parameters are set in the fjgi.conf file per physical interface, when a VLAN interface is used, individual interfaces used by the VLAN interface must be similarly configured.
- The operation mode setup in the fjgi.conf file after system boot may not become effective after installation with DR (Dynamic Reconfiguration) or PCI Hot Plug functions. Check the operation mode with the ndd(1M) command or dladm(1M) command (Solaris 11 only). If the operation mode is not correct, reboot the system and the desired operation mode will become effective.

3.5.2 JumboFrame Setup

By using a JumboFrame the TCP/IP MTU can be expanded from 1500 to 9000. By expanding the single packet transmission size, the number of packets processed can be reduced, and lowering the CPU load is possible.

JumboFrame can be enabled using either of the following three procedures.

- Method 1: Specify in /etc/system and /etc/hostname.fjgi*

When MTU settings must be individually set for each interface, or when the application uses /etc/hostname.fjgi*, please use this method.

1. Add the following line to the /etc/system file.

```
set fjgi:fjgi_jumbo=1
```

2. The MTU of TCP/IP is set by defining an MTU size between 1500 and 9000 in /etc/hostname.fjgi* (*1) in the following format and then rebooting the system. When no MTU value is specified in this file, the default value is set (9000bytes).

1: The asterisk () expresses an instance number. When IPv6 interface is used, assign an IP address or hostname and an MTU size to the fjgi interface by editing the /etc/hostname6.fjgi* file.

Setting format
hostname mtu MTU

Example of setting (when setting MTU of fjgi0 to 8000):

```
# cat/etc/hostname.fjgi0
myhost mtu 8000
```

3. Reboot the system.

- Method 2: Specify in fjgi.conf File

When MTU settings must be individually set for each interface, or when the application does not use /etc/hostname.fjgi* (example: PRIMECLUSTER CF (Cluster Foundation) or CIP (Cluster Interconnect Protocol) function), please use this method.

Refer to the "[3.5.1 Setting the fjgi.conf File](#)" for the setting procedures of JumboFrame.

- Setting method of new style (Recommended)

1. Add the fjgi* parameter to the fjgi.conf file. The parameter value needs to be set by a character string like fjgi0=":::8000:::".

Example of file description (The MTU parameter for fjgi0 is set to 8000):


```
fjgi0=":::8000:::~::~";
```

2. Reboot the system.

- Setting method of old style

1. Add the `fjgi_mtu` parameter to the `fjgi.conf` file. The parameter value needs to be set by numerical value like `fjgi_mtu=8000`.

Example of file description (The MTU parameter for `fjgi0` is set to 8000):

```
name="fjgi" parent="/pci@1,700000/pci@0" unit-address="4"
fjgi_mtu=8000;
```

2. Reboot the system.

- Method 3: Specify in `dladm(1M)` command

This method can be used only by FUJITSU PCI GigabitEthernet 5.0 or later. When MTU settings must be individually set for each interface without reboot, please use this method.

Refer to the "[3.5.1 Setting the `fjgi.conf` File](#)" for the setting procedures of JumboFrame.

- Setup MTU by the following command.

```
dladm set-linkprop -p mtu=value link
```

Example(when setting MTU of `fjgi0` (this vanity name is `net2`) to 8000):

```
# dladm set-linkprop -p mtu=8000 net2
```

- Settings are displayed by the following command.

```
dladm show-linkprop -p mtu link
```

Example(when setting MTU of `fjgi0` (this vanity name is `net2`) to 8000):

```
# dladm show-linkprop -p mtu net2
LINK      PROPERTY      PERM VALUE      DEFAULT      POSSIBLE
net2      mtu             rw    8000          1500         1500-9000
```



Note

- If JumboFrame feature is enabled, the interface will be unable to transmit and receive data in IEEE802.3 format.
- When JumboFrame has been enabled with Method 1, if two or more interfaces or VLAN interfaces are installed, the JumboFrame setting applies to all interfaces.
- It is necessary to inactivate a corresponding interface with the `ifconfig(1M)` command before JumboFrame has been enabled with Method 3. Then activate a corresponding interface with the `ifconfig(1M)` command after enabled.
- When using the JumboFrames feature with the SE0X7GD1X, SE0X7GQ1X or SE0X7GQ2X, use 1000Mbps mode.
- The JumboFrame function setup in `/etc/hostname.fjgi*` or `fjgi.conf` files after system started may not become effective after hot plug or installation with the DR (Dynamic Reconfiguration) and PCI Hot Plug functions. Check the JumboFrame function with the `ndd(1M)` command or `dladm(1M)` command (Solaris 11 only). If the JumboFrame function is not correct, reboot the system and the JumboFrame function will become effective.
- When the interface is connected to a LAN switch, it is necessary to enable the JumboFrame feature on the LAN switch. For more information on the JumboFrame feature of the LAN switch, please refer to the specifications of each LAN switch.

3.5.3 Using the ndd(1M) command

By using the ndd(1M) command, the interface communication mode can be changed dynamically. Usually it is not necessary to change the interface communication mode using the ndd(1M) command, but when you experience the following, please change the interface communication mode using the ndd(1M) command.

This method is not supported by FUJITSU PCI GigabitEthernet 5.0 or later.

Example

- You changed a remote device from one which supports Auto-Negotiation to another which does not support Auto-Negotiation or vice versa after system startup.



Note

- When using the ndd(1M) command to change interface communication modes, it is necessary to change or reset the Link Status *after* making the changes. This causes the changes to be recognized by the hardware and dynamically take effect. Using ndd(1M) to change the adv_autoneg_cap parameter cause a Link Status change. Please note in the "To set" examples below that the last step is always a change to the adv_autoneg_cap parameter.

- How to Use the ndd(1M) Command

The following examples show how to display and set parameters using the ndd(1M) command.

- To display:

```
ndd -get /dev/fjgi* param
```

(Note) Please put a decimal number (instance number) in place of the asterisk (*).

example: The state of the link of fjgi2 will be displayed.

```
# ndd -get /dev/fjgi2 link_status
1
```

- To set:

```
ndd -set /dev/fjgi* param value
```

(Note) Please put a decimal number (instance number) in place of the asterisk (*).

example: 1000Mbps/FullDuplex is disabled on interface fjgi2.

```
# ndd -set /dev/fjgi2 adv_1000fdx_cap 0
```

(Note) In this stage, the setting is not reflected in hardware yet.

- When the setting change is reflected in hardware (with no change of an Auto-Negotiation value):

```
ndd -set /dev/fjgi* param1 value          (Change of setting 1)
ndd -set /dev/fjgi* param2 value          (Change of setting 2)
:                                          :
ndd -set /dev/fjgi* adv_autoneg_cap N      (Once let Auto-Negotiation have a different value from
                                           the current value.)
ndd -set /dev/fjgi* adv_autoneg_cap M      (Auto-Negotiation is returned to the original value.)
```

(Note) Please put a decimal number (instance number) in place of the asterisk (*).

example: When changing fjgi0 into 100Full (autonego=1, link_sppd=100, link_mode=1) from a default state (autonego=1, link_speed=1000, link_mode=1) while Auto-Negotiation is enabled.

```
# ndd -set /dev/fjgi0 adv_1000fdx_cap 0
# ndd -set /dev/fjgi0 adv_1000hdx_cap 0
# ndd -set /dev/fjgi0 adv_autoneg_cap 0
# ndd -set /dev/fjgi0 adv_autoneg_cap 1
```

(Note) The last two commands above change the Auto-Negotiation setting, then change the setting back. This causes the Link Status to change, and is required to make the settings effective.

- When the setting change is reflected in hardware (an Auto-Negotiation value being subject to change):

```
ndd -set /dev/fjgi* param1 value      (Change of setting 1)
ndd -set /dev/fjgi* param2 value      (Change of setting 2)
      :                               :
ndd -set /dev/fjgi* adv_autoneg_cap N (Let Auto-Negotiation have a different value from the
                                         current value.)
```

(Note) Please put a decimal number (instance number) in place of the asterisk (*).

example: When changing fjgi0 into 100Full (autonego=0, link_sppd=100, link_mode=1) from a default state (autonego=1, link_speed=1000, link_mode=1) while Auto-Negotiation had been disabled.

```
# ndd -set /dev/fjgi adv_1000fdx_cap 0
# ndd -set /dev/fjgi adv_1000hdx_cap 0
# ndd -set /dev/fjgi adv_autoneg_cap 0
```

(Note) The last command above changes the Auto-Negotiation setting. This causes the Link Status to change, and is required to make the settings effective.

- The ndd(1M) Command Parameters

The following parameters can be used with the ndd(1M) command.

Parameters:

Parameter	Status	Meaning
?	Read only	Display parameter list
link_status	Read only	0: Link down 1: Link up
link_speed	Read only	10: 10Mbps 100: 100Mbps 1000: 1000Mbps
link_mode	Read only	0: Half Duplex 1: Full Duplex
autonego	Read only	0: Auto-Negotiation is Off. 1: Auto-Negotiation is On.
flow_control	Read only	0: None (flow_control disabled) 1: LocSend (Can transmit pause frame only) 2: Rem (Can receive pause frame only) 3: Sym (Can receive and transmit pause frame)
cardtype	Read only	0: SX (SE0X7GD2X) 1: T (SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X)

Parameter	Status	Meaning
adv_10fdx_cap	Read and write	10Mbps/FullDuplex Setting 0: Disabled 1: Enabled (default)
adv_10hdx_cap	Read and write	10Mbps/HalfDuplex Setting 0: Disabled 1: Enabled (default)
adv_100fdx_cap	Read and write	100Mbps/FullDuplex Setting 0: Disabled 1: Enabled (default)
adv_100hdx_cap	Read and write	100Mbps/HalfDuplex Setting 0: Disabled 1: Enabled (default)
adv_1000fdx_cap	Read and write	1000Mbps/FullDuplex Setting 0: Disabled 1: Enabled (default)
adv_1000hdx_cap	Read and write	1000Mbps/HalfDuplex Setting 0: Disabled 1: Enabled (default)
adv_pauseTX	Read and write	Transmit Pause Frame Setting 0: Disabled 1: Enabled (default)
adv_pauseRX	Read and write	Receive Pause Frame Setting 0: Disabled 1: Enabled (default)
adv_autoneg_cap	Read and write	Auto-Negotiation Setting 0: Auto-Negotiation Off (Forced mode) 1: Auto-Negotiation On (default)
adv_role_cap	Read and write	The Role setting when operating at 1000Mbps. (used with SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X only) 0: Slave 1: Master 2: Auto (default)
lp_10fdx_cap	Read only	Set link-partner to 10Mbps/FullDuplex by Auto-Negotiation. 0: Disabled 1: Enabled
lp_10hdx_cap	Read only	Set link-partner to 10Mbps/HalfDuplex by Auto-Negotiation. 0: Disabled 1: Enabled
lp_100fdx_cap	Read only	Set link-partner to 100Mbps/FullDuplex by Auto-Negotiation. 0: Disabled 1: Enabled
lp_100hdx_cap	Read only	Set link-partner to 100Mbps/HalfDuplex by Auto-Negotiation. 0: Disabled 1: Enabled
lp_1000fdx_cap	Read only	Set link-partner to 1000Mbps/FullDuplex by Auto-Negotiation. 0: Disabled 1: Enabled
lp_1000hdx_cap	Read only	Set link-partner to 1000Mbps/HalfDuplex by Auto-Negotiation. 0: Disabled 1: Enabled

Parameter	Status	Meaning
lp_pauseTX	Read only	Set link-partner to transmit pause frame by Auto-Negotiation. 0: Disabled 1: Enabled
lp_pauseRX	Read only	Set link-partner to receive pause frame by Auto-Negotiation. 0: Disabled 1: Enabled
lp_autoneg_cap	Read only	Set link-partner to Auto-Negotiate. 0: Disabled 1: Enabled
role_cap	Read only	The current Role setting when operating at 1000Mbps. (used with SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X only) 0: Slave 1: Master
jumbo	Read only	0: JumboFrame support disabled. 1: JumboFrame support enabled.
ReceiveTicks	Read only	Time to wait for an interrupt for receiving is specified (micro seconds). 0 to 1000 (default: 77)
TransmitTicks	Read only	Time to wait for an interrupt for transmitting is specified (micro seconds). 0 to 1000 (default: 500)
ReceiveMaxBD	Read only	The number of buffer descriptor to wait for an interrupt for receiving is specified. 1 to 500 (default: 10)
TransmitMaxBD	Read only	The number of buffer descriptor to wait for an interrupt for transmitting is specified. 1 to 500 (default: 128)

Note

- Using Auto-Negotiation (the default setting) is recommended for speed, duplex, and flow control. When Auto-Negotiation is used, the remote device should also be setup for Auto-Negotiation. Using Auto-Negotiation on both local and remote devices allows the appropriate speed, duplex, and flow control to be set up automatically.
- HalfDuplex modes are not supported with the SE0X7GD2X.
- The SE0X7GD2X supports 1000Mbps operation only.
- When you use the ndd(1M) command to change the mode of operation, please set the same mode of operation on local and remote devices. When the mode of operation is not the same between local and remote devices, link up may fail, a communication error may occur (even if link is up), or the mode of operation may not be the same as specified.
- Due to the ndd(1M) command specification, if two or more processes execute the ndd(1M) command for the same driver at the same time, the resulting value will be invalid.
- If the ndd(1M) command is executed repeatedly, the fjgi driver's performance may decrease.
- The link_speed, link_mode, autonego, and flow_control parameter values are valid only when link_status=1. If link_status=0, these values are invalid.

- The values of `lp_10fdx_cap`, `lp_10hdx_cap`, `lp_100fdx_cap`, `lp_100hdx_cap`, `lp_1000fdx_cap`, `lp_1000hdx_cap`, `lp_pauseTX`, `lp_pauseRX`, and `lp_autoneg_cap` parameters are valid only when Auto-Negotiation is successfully established. These parameter values are invalid when Auto-Negotiation is disabled or when Auto-Negotiation fails.
- The parameter values set by the `ndd(1M)` command become invalid after rebooting the system.
- Operation mode setting using the `ndd(1M)` command becomes effective for each physical interface. Therefore, the operation modes of the VLAN interface and IPv4/IPv6 interface are changed at the same time.

3.5.4 Using the `dladm(1M)` command

By using the `dladm(1M)` command, the interface communication mode can be changed dynamically. Usually it is not necessary to change the interface communication mode using the `dladm(1M)` command, but when you experience the following, please change the interface communication mode using the `dladm(1M)` command.

This method can be used only by FUJITSU PCI GigabitEthernet 5.0 or later.

Example:

- You changed a remote device from one which supports Auto-Negotiation to another which does not support Auto-Negotiation or vice versa after system startup.
- You want to change setting JumboFrame without rebooting.

- How to Use the `dladm(1M)` Command

The following examples show how to display and set a property using the `dladm(1M)` command.

- To display:

```
dladm show-linkprop -p prop link (prop: property name)
```

example: The state of the link of `fjgi2` (this vanity name is `net4`) will be displayed.

```
# dladm show-linkprop -p state net4
LINK      PROPERTY      PERM VALUE      DEFAULT      POSSIBLE
net4      state          r-   --         up           up,down
```

- To set:

```
dladm set-linkprop -p prop=value link (prop: property name, value: value of property)
```

example: 1000Mbps/FullDuplex is disabled on interface `fjgi2` (this vanity name is `net4`).

```
# dladm set-linkprop -p en_1000fdx_cap=0 net4
```

- The `dladm(1M)` Command Properties

The following properties can be used with the `dladm(1M)` command.

Properties:

Property	Status	Meaning
speed	Read only	10: 10Mbps 100: 100Mbps 1000: 1000Mbps
duplex	Read only	half: Half Duplex full: Full Duplex
state	Read only	down: Link down up: Link up

Property	Status	Meaning
adv_autoneg_cap	Read and write	Auto-Negotiation Setting 0: Auto-Negotiation Off (Forced mode) 1: Auto-Negotiation On (default)
mtu (*1)	Read and write	MTU (byte) Setting 1500 to 9000 (default: 1500)
flowctrl	Read and write	Flow_Control Setting no: None (flow_control disabled) tx: Local Send (Can transmit pause frame only) rx: Remote Send (Can receive pause frame only) bi: Symmetric (Can receive and transmit pause frame) pfc: Priority-base (Can receive and transmit pause frame including the priority value) (not supported) auto: Auto (mode is dynamically determined) (not supported)
adv_10fdx_cap	Read only	10Mbps/FullDuplex Actual Setting 0: Disabled 1: Enabled
en_10fdx_cap	Read and write	10Mbps/FullDuplex Setting 0: Disabled 1: Enabled (default)
adv_10hdx_cap	Read only	10Mbps/HalfDuplex Actual Setting 0: Disabled 1: Enabled
en_10hdx_cap	Read and write	10Mbps/HalfDuplex Setting 0: Disabled 1: Enabled (default)
adv_100fdx_cap	Read only	100Mbps/FullDuplex Actual Setting 0: Disabled 1: Enabled
en_100fdx_cap	Read and write	100Mbps/FullDuplex Setting 0: Disabled 1: Enabled (default)
adv_100hdx_cap	Read only	100Mbps/HalfDuplex Actual Setting 0: Disabled 1: Enabled
en_100hdx_cap	Read and write	100Mbps/HalfDuplex Setting 0: Disabled 1: Enabled (default)
adv_1000fdx_cap	Read only	1000Mbps/FullDuplex Actual Setting 0: Disabled 1: Enabled
en_1000fdx_cap	Read and write	1000Mbps/FullDuplex Setting 0: Disabled 1: Enabled (default)
adv_1000hdx_cap	Read only	1000Mbps/HalfDuplex Actual Setting 0: Disabled 1: Enabled
en_1000hdx_cap	Read and write	1000Mbps/HalfDuplex Setting 0: Disabled 1: Enabled (default)

Property	Status	Meaning
_cardtype (*2)	Read only	0: SX (SE0X7GD2X) 1: T (SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X)
_Role_A (*2)	Read and write	Role setting when operating at 1000Mbps. (used with SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X only) 0: Slave 1: Master 2: Auto (default)
_ReceiveTicks (*2)	Read and write	Time to wait for an interrupt for receiving is specified (micro seconds). 0 to 1000 (default: 77)
_TransmitTicks (*2)	Read and write	Time to wait for an interrupt for transmitting is specified (micro seconds). 0 to 1000 (default: 500)
_ReceiveMaxBD (*2)	Read and write	The number of buffer descriptor to wait for an interrupt for receiving is specified. 1 to 500 (default: 10)
_TransmitMaxBD (*2)	Read and write	The number of buffer descriptor to wait for an interrupt for transmitting is specified. 1 to 500 (default: 128)

*1: It is necessary to inactivate a corresponding interface with the ifconfig(1M) command before JumboFrame has been enabled. Then activate a corresponding interface with the ifconfig(1M) command after enabled.

*2: _cardtype, _Role_A, _ReceiveTicks, _TransmitTicks, _ReceiveMaxBD, _TransmitMaxBD are extended properties. These are not displayed by dladm show-linkprop command but can be set.

Note

- Using Auto-Negotiation (the default setting) is recommended for speed, duplex, and flow control. When Auto-Negotiation is used, the remote device should also be setup for Auto-Negotiation. Using Auto-Negotiation on both local and remote devices allows the appropriate speed, duplex, and flow control to be set up automatically.
- HalfDuplex modes are not supported with the SE0X7GD2X.
- The SE0X7GD2X supports 1000Mbps operation only.
- When you use the dladm(1M) command to change the mode of operation, please set the same mode of operation on local and remote devices. When the mode of operation is not the same between local and remote devices, link up may fail, a communication error may occur (even if link is up), or the mode of operation may not be the same as specified.
- The default values of the tuning parameter which provide higher throughput are recommended for the most systems. Only when you need a smaller latency for a specific use, change the values of the parameters. You need to check if the specified parameters provide a suitable latency and throughput for your systems. When the values of these parameters are set small, the latency will be improved, but the throughput will fall.
- If the dladm(1M) command is executed repeatedly, the fgi driver's performance may decrease.
- The speed, duplex, autonego, and flowctrl properties values are valid only when state=1. If state=0, these values are invalid.
- After rebooting the system, the value set by dladm(1M) command remain effective.
- Operation mode setting using the dladm(1M) command becomes effective for each physical interface. Therefore, the operation modes of the VLAN interface and IPv4/IPv6 interface are changed at the same time.

3.5.5 FCode Settings

FCode settings must be changed when the remote device does not support Auto-Negotiation and the communication by FCode is needed (example: Network Installation). FCode changes are not required for Network Installation if the remote device supports Auto-Negotiation. Use the following procedure and examples to change FCode settings. Changing the FCode settings is possible on SE0X7GD2X/SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X.

- How to Set FCode Force Mode (Fixed Speed, Disabled Auto-Negotiation):

- Search for the device path for the Gigabit Ethernet card at the ok prompt after the system was stopped by a command like "shutdown -i0 -g0 -y". (Please refer to chapter "[3.4 Identification of the Gigabit Ethernet Card](#)".)

example:

```
ok show-nets
a) /pci@1,700000/pci@0/FJSV,e2ta@4,1
b) /pci@1,700000/pci@0/FJSV,e2ta@4
c) /pci@0,600000/pci@0,1/network@1,1
d) /pci@0,600000/pci@0,1/network@1
q) NO SELECTION
Enter Selection, q to quit:
```

In above example, "a) /pci@1,700000/pci@0/FJSV,e2ta@4,1" and "b) /pci@1,700000/pci@0/FJSV,e2ta@4" represent an SE0X7GD1X card.

- Select the device as follows.

example:

```
ok cd /pci@1,700000/pci@0/FJSV,e2ta@4
```

- Execute the following command to change the mode to Force mode (speed fixed, Auto-Negotiation off) from Auto-Negotiation mode. FCode settings are effective only during OBP (Open Boot Prom).

1. The only mode which can be set on SE0X7GD2X (1000BASE-SX) is as follows.

- Execute the following command to set Full Duplex communication, 1000Mbps.

```
ok transfer-speed=1000
```

2. The available modes which can be set on SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X are as follows.

- Execute the following command to set Full Duplex communication, 100Mbps.

```
ok transfer-speed=100
```

- Execute the following command to set Half Duplex communication, 100Mbps.

```
ok transfer-speed=100
ok half-duplex
```

- Execute the following command to set Full Duplex communication, 10bps.

```
ok transfer-speed=10
```

- Execute the following command to set Half Duplex communication, 10Mbps.

```
ok transfer-speed=10
ok half-duplex
```

- Execute the following command to display the current settings.

```
ok .properties
```

The following example shows the current settings of a SE0X7GD1X card installed in a SPARC Enterprise M9000.

```
{6} ok cd /pci@4,600000/pci@0/FJSV,e2ta@4
{6} ok .properties
duplex                half          <-- (*1)
transfer-speed        0000000a      <-- (*2)
status                okay
assigned-addresses    82032010 00000000 00100000 00000000 00010000
                     82032018 00000000 00110000 00000000 00010000
                     82032030 00000000 00120000 00000000 00010000
local-mac-address     00 e0 ed 12 a8 3c
fjgiga-rev            000000c3
product-name          FJSV,e2ta
device_type           network
address-bits          00000030
max-frame-size        00004000
reg                  00032000 00000000 00000000 00000000 00000000
                     03032010 00000000 00000000 00000000 00010000
                     03032018 00000000 00000000 00000000 00010000
                     02032030 00000000 00000000 00000000 00010000
model                 Broadcom,BCM5715C
compatible            fjgi
name                  FJSV,e2ta
media-type            1000BASE-T
version               1.0
fcode-rom-offset      00000000
66mhz-capable
fast-back-to-back
devsel-speed          00000001
latency-timer         00000040
max-latency           00000000
min-grant              00000040
interrupts            00000001
cache-line-size       00000010
class-code            00020000
subsystem-id          00000066
subsystem-vendor-id   00001374
revision-id           000000a3
device-id             00001678
vendor-id             000014e4
```

*1: Displayed only when half-duplex is set.

*2: Displayed only when transfer-speed is set to a specific value. [10Mbps: 0xa, 100Mbps: 0x64, 1000Mbps: 0x3e8]

Note: *1 and *2 are not displayed in the default configuration.



- Changes to FCode settings are lost after executing the reset-all command from the ok prompt (See "How to Return to Default FCode Settings (Auto-Negotiation Mode)"), or after power cycling the system.

- How to Return to Default FCode Settings (Auto-Negotiation Mode):

- To return to default FCode settings, execute the following command from the ok prompt, or power cycle the system.

```
ok reset-all
```

3.6 Network Installation

See the document "*Install Server Build Guide I/O Device Driver (SPARC Enterprise)*" for the installation procedure.

3.7 VLAN Interface Setup

This section provides information about the VLAN interface and setting up the VLAN interface.

- [3.7.1 IEEE 802.1Q TagVLAN](#)
- [3.7.2 Setting Up the VLAN Interface](#)

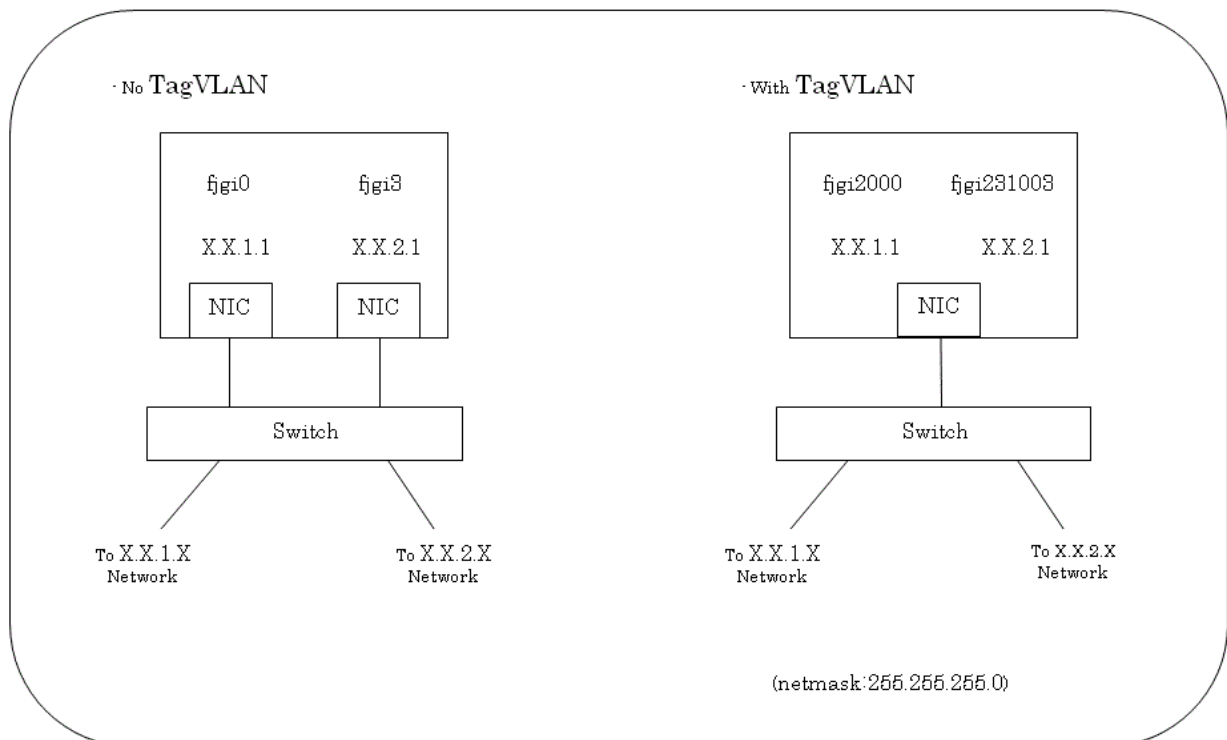
3.7.1 IEEE 802.1Q TagVLAN

The IEEE 802.1Q TagVLAN function is described in the following.

- IEEE 802.1Q TagVLAN

- The TagVLAN function provides the ability to create two or more separate networks that share a single physical interface. Virtual interfaces are created by assigning VLAN IDs (VIDs) to a physical interface. Communication between different VID interfaces on the same host is not allowed. The following example shows a comparison of the networks created without and with the TagVLAN feature.

Figure 3.1 Example of using VLAN



By using a VLAN, traffic management of two or more networks on a single physical interface can be done.

In order to create a VLAN environment, a switch capable of supporting a VLAN setup (VID and Tagged/Untagged setting) is required.

The FUJITSU PCI GigabitEthernet 4.1 or later drivers support:

Supported VIDs	1 - 4094
Max number of VLAN interfaces	1024

3.7.2 Setting Up the VLAN Interface

The VLAN interface is set up using the following procedures.

- By setting the interface number to 1000 or greater, it is possible to distinguish VLAN interfaces from physical interfaces.

The three lower digits of the VLAN interface number: physical instance number
The upper digits of the VLAN interface number: VID (1 - 4094).

VLAN interface number = VID * 1000 + physical instance number

- VLAN Interface Setup Examples

- Solaris 10 8/07 or later

- To create a VLAN Interface of VID=2 for a physical instance having instance number zero, the following is used.
Refer to [3.3 Environment Setting](#), and perform the procedure described. Use **fjgi2000** as the driver name.
- To create a VLAN Interface of VID=231 for a physical instance having instance number three, the following is used.
Refer to [3.3 Environment Setting](#), and perform the procedure described. Use **fjgi231003** as the driver name.

- VLAN interfaces are displayed by the following command.

```
dladm show-link | grep fjgi
```

Example:

```
# dladm show-link | grep fjgi
fjgi0          type: non-vlan  mtu: 1500      device: fjgi0
fjgi2000       type: vlan 2    mtu: 1500      device: fjgi0
fjgi1          type: non-vlan  mtu: 1500      device: fjgi1
fjgi2          type: non-vlan  mtu: 1500      device: fjgi2
fjgi3          type: non-vlan  mtu: 1500      device: fjgi3
fjgi231003     type: vlan 231 mtu: 1500      device: fjgi3
```

In the above example, the VLAN interfaces are displayed as fjgi1000 (VID=1) and fjgi231003 (VID=231).

- Solaris 11

- To create a VLAN Interface of VID=2 for fjgi0 (this vanity name is net2), the following is used.
Refer to [3.3 Environment Setting](#), and perform the procedure described. Use **net2002** as the driver name.

```
dladm create-vlan -l ether-link -v vid
```

Example:

```
# dladm create-vlan -l net2 -v 2
```

- To create a VLAN Interface of VID=231 for fgi3 (this vanity name is net5), the following is used.

Refer to "3.3 Environment Setting", and perform the procedure described. Use **net231005** as the driver name.

```
dladm create-vlan -l ether-link -v vid
```

Example:

```
# dladm create-vlan -l net5 -v 231
```

- VLAN interfaces are displayed by the following command.

```
dladm show-link
or
dladm show-vlan
```

Example:

```
# dladm show-link
net2          phys      1500  up    --
net2002       vlan      1500  up    net2
net3          phys      1500  up    --
net4          phys      1500  up    --
net5          phys      1500  up    --
net231005     vlan      1500  up    net5
#
# dladm show-vlan
net2002       2          net2          -----
net231005     231       net5          -----
```

In the above example, the VLAN interfaces are displayed as net2002 (VID=2) and net231005 (VID=231). Please refer to "3.2 Identification of Interface Name" for details about the relationship of "fgi*" to "net*" (where * represents an instance number).

- To delete VLAN interfaces, the following is used.

It is necessary to inactivate a corresponding interface with the ifconfig(1M) command before executing the following command.

```
dladm delete-vlan vlan-link
```

Example:

```
# dladm delete-vlan net2002
# dladm delete-vlan net231005
```

Note

- When connecting VLAN interfaces to a LAN switch, the switch must support Tag VLAN.
On the switch, set VLAN tagging and VLAN ports appropriately based on the VLANs setup on the server.
- Use the VLAN interface only with the TCP/IP.
- In a PRIMECLUSTER environment, when using a VLAN interface, check that the "SMAWdtp" package has not been installed. If "SMAWdtp" is installed, remove the package before setting up the VLAN interface or do not use the VLAN interface.
- A VLAN interface uses approximately 700Kb of memory when MTU is 1500, or 900Kb of memory when MTU is 9000 in an idle state. Therefore, when using two or more VLAN interfaces, a system slowdown may occur due to a shortage of resources, depending on system configuration. When using VLAN functionality, provide sufficient memory resources to ensure optimal system performance.

Chapter 4 LinkAggregation Feature

This chapter outlines the LinkAggregation feature, and explains the settings required to use this feature.

- [4.1 About LinkAggregation Feature](#)
- [4.2 Configuration of the LinkAggregation Feature](#)
- [4.3 Notes](#)

4.1 About LinkAggregation Feature

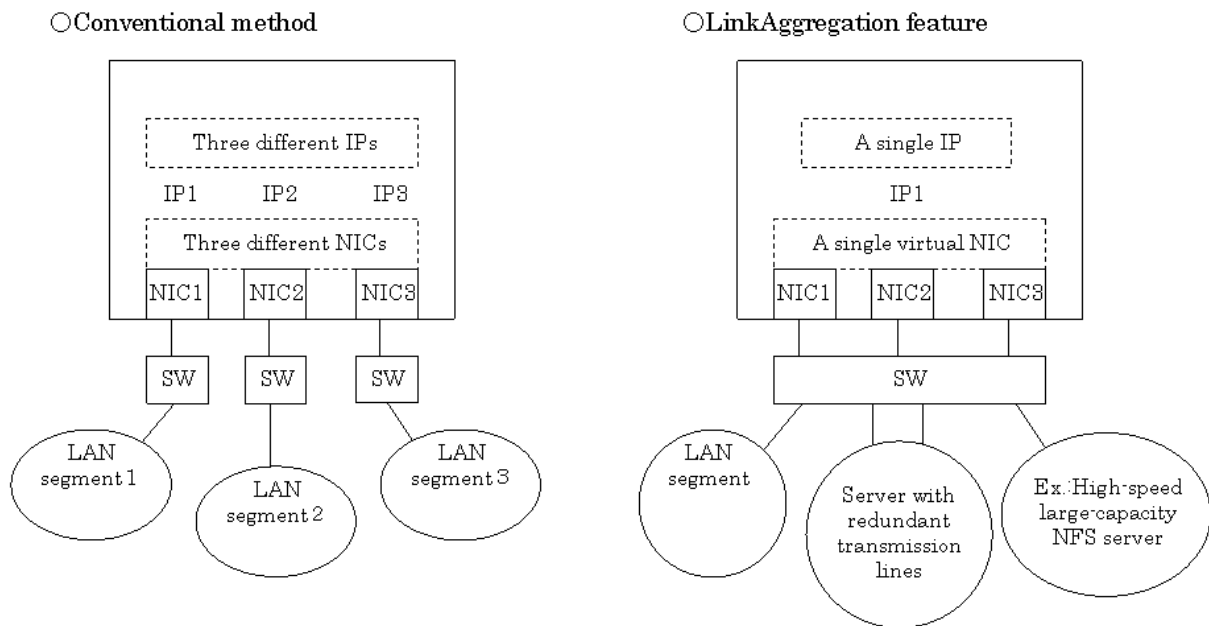
This section explains the LinkAggregation feature.

- LinkAggregation Feature

Communication bandwidth and network redundancy (*1) can be improved by grouping two or more network interfaces as one virtual interface (*2). It is effective when handling large amounts of data, or when providing large-scale customer service.

*1: As long as at least one transmission route available is available, communication will continue.

*2: The maximum number of interfaces in a group is 255.



- Requirements

"[Table 4.1 Requirements](#)" show requirements for the LinkAggregation feature.

Table 4.1 Requirements

- OS: Solaris 10 8/07 or later
- Server model: SPARC Enterprise
- GLDv3 interfaces
- Full duplex communication
- Same speed for all grouped interfaces
- TCP/IP connection

- LAN switch that supports the LinkAggregation (or equivalent) feature

- Data Distribution Mode

"Table 4.2 Data Distribution Mode" shows data distribution modes that FUJITSU Gigabit Ethernet 4.1 or later supports.

Table 4.2 Data Distribution Mode

L2 distribution	The driver decides on the destination NIC based on the MAC (L2) header of sent data and sends the data to the destination. When there are many remote systems which the local system sends to, this method decreases the possibility that the network channel is monopolized by one remote system, and improves transfer efficiency for other remote systems.
L3 distribution	The driver decides on the destination NIC based on the IP(L3) header of sent data and sends the data to the destination. When there are many remote systems which the local system sends to, this method decreases the possibility that the network channel is monopolized by one remote system, and improves transfer efficiency for other remote systems. Even if a router is installed between systems, sending data are distributed. If one system used as a router sends data from multiple local systems to the same remote system, this method decreases the possibility that the network channel is monopolized, and improves transfer efficiency for other local systems.
L4 distribution (default)	The driver decides on the destination NIC based on the TCP, UDP or other ULP (L4) headers of sent data and sends the data to the destination. If one system is directly connected to another system, this method distributes the sending data, and improves transfer efficiency for the remote system.

These data distribution methods (L2 distribution, L3 distribution and L4 distribution) can be used together arbitrarily.

- LACP Mode

"Table 4.3 LACP Mode" shows the LACP modes supported.

The LACP is a protocol to negotiate the configuration of the LinkAggregation Group between devices to group multiple network interfaces as one virtual interface.

By using LACP, it is not necessary to inactivate the LinkAggregation Group when the configuration of the LinkAggregation Group is changed. The driver can detect the configuration change of the LinkAggregation Group immediately and can re-constitute a LinkAggregation Group automatically.

Table 4.3 LACP Mode

active mode	<p>The driver transmits the LACP periodically, regardless of the LACP mode of the partner device.</p> <p>It is necessary to set the LACP mode of the partner device to active or passive.</p> <p>This mode is used for re-configuring the LinkAggregation Group of the local device automatically, when the configuration of the LinkAggregation Group of the partner device is changed.</p>
passive mode	<p>The driver does not transmit the LACP unless the LACP is transmitted by the partner device.</p> <p>It is necessary to set the LACP mode of the partner device to active.</p>

	This mode is used for re-configuring the LinkAggregation Group of the partner device automatically when the configuration of the LinkAggregation Group of the local device is changed. Also, the driver does not need to transmit the LACP for cases when the local device functions as a router, or the partner device does not implement LACP.
off mode (default)	<p>The driver does not transmit the LACP, regardless of the LACP mode of the partner device.</p> <p>It is necessary to set the LACP mode of the partner device to off.</p> <p>This mode has the effect of transmitting no LACP and is used when the configurations of the LinkAggregation Groups of both devices will not be changed.</p>

- LACP Timer

"[Table 4.4 LACP Timer](#)" shows the LACP timer values supported.

Table 4.4 LACP Timer

short (default)	<p>The driver transmits the LACP every one second.</p> <p>With this timer value the number of LACP transmissions is higher, but there is the effect of detecting the configuration change of the LinkAggregation Group of the partner device immediately.</p> <p>If the LACP timer value of the partner device is "long", the driver transmits the LACP every 30 seconds. When the LACP timer value of the partner device is unidentified, this timer value is used.</p>
long	<p>The driver transmits the LACP every 30 seconds.</p> <p>With this timer value LinkAggregation Group configuration changes of the partner device are detected within 30 seconds, and the number of LACP transmissions is relatively few.</p> <p>If the LACP timer value of the partner device is "short", the driver transmits the LACP every one second.</p>

4.2 Configuration of the LinkAggregation Feature

The LinkAggregation feature can be configured with the following method.

- [4.2.1 Setting and Displaying the Configuration with the dladm\(1M\) Command](#)

4.2.1 Setting and Displaying the Configuration with the dladm(1M) Command

The dladm(1M) command has the following six subcommands.

- [4.2.1.1 Create a LinkAggregation \(dladm create-aggr\)](#)
- [4.2.1.2 Delete a LinkAggregation \(dladm delete-aggr\)](#)
- [4.2.1.3 Modify a LinkAggregation \(dladm modify-aggr\)](#)
- [4.2.1.4 Add Interfaces to a LinkAggregation \(dladm add-aggr\)](#)
- [4.2.1.5 Remove Interfaces from a LinkAggregation \(dladm remove-aggr\)](#)
- [4.2.1.6 Display LinkAggregation Statistics and Information \(dladm show-aggr\)](#)



Note

- For more information about the `dladm(1M)` command, please refer to the "System Administration Guide: IP Services" and the "man pages section 1M: System Administration Commands" of Oracle Documentation.

4.2.1.1 Create a LinkAggregation (`dladm create-aggr`)

This section explains the `dladm create-aggr` command for activating LinkAggregation.

- Synopsis

- **Solaris 10 8/07 or later**

```
/usr/sbin/dladm create-aggr -d dev [-d dev] ... key
```

`-d dev`: Specify the name of the physical interface (including instance number) belonging to a LinkAggregation Group (*1)
You can specify one to 255 devices.

`key`: Specify the key number to identify the LinkAggregation
Specify a number ranging from 1 to 999.

*1: The group means an aggregate unit of the interfaces to distribute, to collect and to make mutually redundant.

- **Solaris 11**

```
/usr/sbin/dladm create-aggr -l ether-link [-l ether-link...] aggr-link
```

`-l ether-link`: Specify the name of the physical interface (including instance number) belonging to a LinkAggregation Group (*2)
You can specify one to 255 devices.

`aggr-link`: The name of the representative interface. The name of the representative interface.

*2: The group means an aggregate unit of the interfaces to distribute, to collect and to make mutually redundant.

- Description

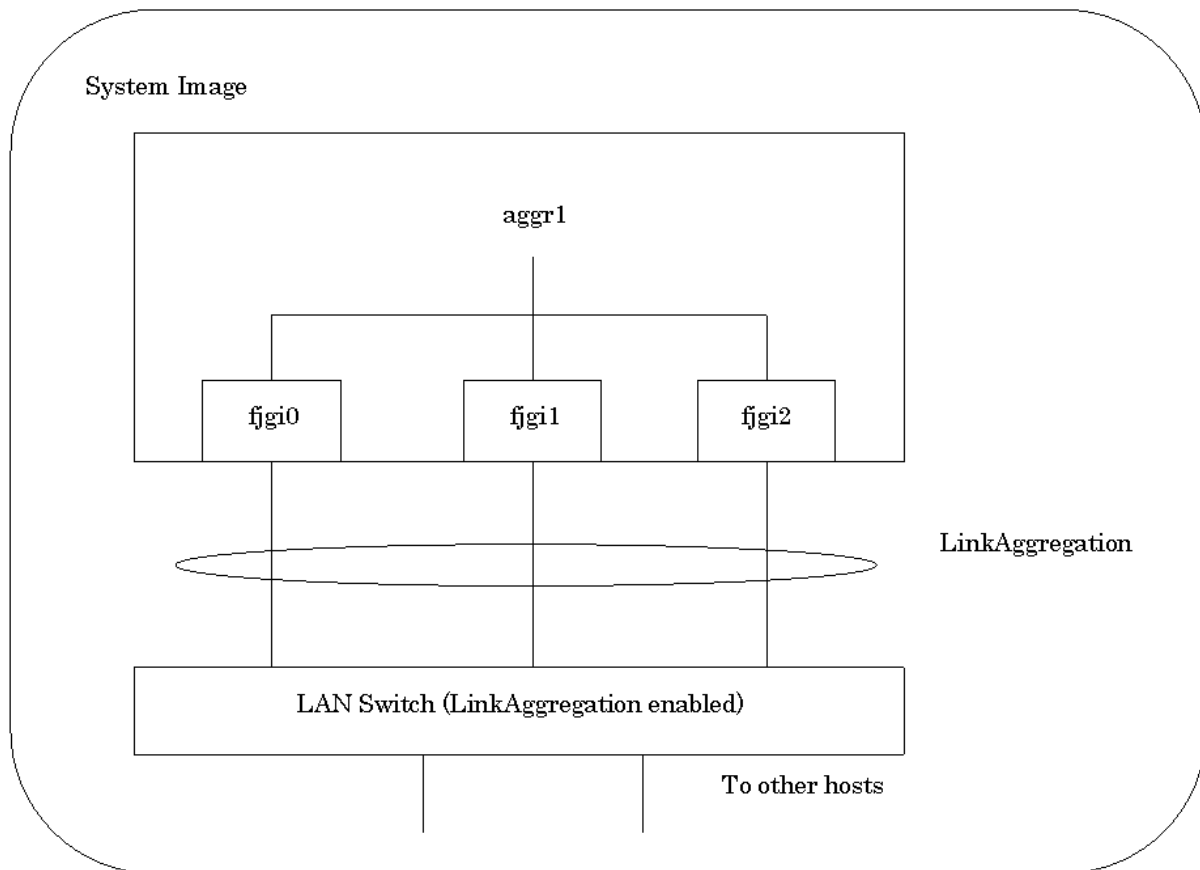
Creates a LinkAggregation Group.

- Exit Code

0: normal end.
>0: abnormal end.

- Example

Processes to create and activate a LinkAggregation Group are shown below.



1. Create the LinkAggregation Group

- Solaris 10 8/07 or later

The following example shows how to create the LinkAggregation Group with the fjgi0, fjgi1 and fjgi2 interfaces and "key=1":

```
# /usr/sbin/dladm create-aggr -d fjgi0 -d fjgi1 -d fjgi2 1
```

- Solaris 11

The following example shows how to create the LinkAggregation Group with the fjgi0(this vanity name is net2), fjgi1(this vanity name is net3) and fjgi2(this vanity name is net4) interfaces and "aggr-link=aggr1":

```
# /usr/sbin/dladm create-aggr -l net2 -l net3 -l net4 aggr1
```

2. Activate the LinkAggregation Group

- Solaris 10 8/07 or later

- The following example shows how to activate the "key=1" LinkAggregation Group and start the LinkAggregation (*1). ("IP address=192.168.150.1" is assigned to the representative interface "aggr1".):

```
# ifconfig aggr1 plumb 192.168.150.1 up
```

*1: After rebooting the system, the representative interface aggr1 is not activated.

- The following example shows how to setup the "key=1" LinkAggregation Group for activation after rebooting the system. ("IP address=192.168.150.1" is assigned to the representative interface "aggr1".):

1. Describe the hostname in the /etc/hostname.aggr1 file.

Example (Hostname is giga-lacp):

```
# cat /etc/hostname.aggr1
giga-lacp
```

2. Define the relation between the IP address and the hostname in the /etc/inet/hosts file.

Example (Hostname is giga-lacp and its IP address is 192.168.150.1):

```
# cat /etc/inet/hosts
192.168.150.1 giga-lacp
```

3. Reboot the system.

```
# shutdown -y -g0 -i6
```

- The following example shows how to create a VLAN interface with the "key=1" LinkAggregation Group (*2). ("IP address=192.168.151.1" is assigned to the VLAN interface "aggr2001" of "VID=2").:

```
# ifconfig aggr2001 plumb 192.168.151.1 up
```

*2: After rebooting the system, the VLAN interface aggr2001 is not activated.

- The following example shows how to setup the VLAN interface with the "key=1" LinkAggregation Group for activation after rebooting the system. ("IP address=192.168.151.1" is assigned to the VLAN interface "aggr2001" of "VID=2").:

1. Describe the hostname in the /etc/hostname.aggr2001 file.

Example (Hostname is giga-vlan):

```
# cat /etc/hostname.aggr2001
giga-vlan
```

2. Define the relation between the IP address and the hostname in the /etc/inet/hosts file.

Example (Hostname is giga-vlan and its IP address is 192.168.151.1):

```
# cat /etc/inet/hosts
192.168.151.1 giga-vlan
```

3. Reboot the system.

```
# shutdown -y -g0 -i6
```

- Solaris 11

- The following example shows how to activate the "aggr-link=aggr1" LinkAggregation Group and start the LinkAggregation (*3). ("IP address=192.168.150.1" is assigned to the representative interface "aggr1".)

```
# ifconfig aggr1 plumb 192.168.150.1 up
```

*3: After rebooting the system, the representative interface aggr1 is not activated.

- The following example shows how to setup the "aggr-link=aggr1" LinkAggregation Group for activation after rebooting the system. ("IP address=192.168.150.1" is assigned to the representative interface "aggr1".):

1. Define the relation between the IP address and the hostname in the /etc/inet/hosts file.

Example (Hostname is giga-lacp and its IP address is 192.168.150.1):

```
# cat /etc/hosts
192.168.150.1 giga-lacp
```

2. Setup the hostname and prefix length to aggr1 by ipadm(1M) command.

Example (Hostname is giga-lacp and prefix length is 24):

```
# ipadm create-ip aggr1
# ipadm create-addr -T static -a giga-lacp/24 aggr1/v4static
```

- The following example shows how to create a VLAN interface with the "aggr-link=aggr1" LinkAggregation Group(*4). ("IP address=192.168.151.1" is assigned to the VLAN interface "aggr2001" of "VID=2").:

```
# dladm create-vlan -l aggr1 -v 2
# ifconfig aggr2001 plumb 192.168.151.1 up
```

*4: After rebooting the system, the VLAN interface aggr2001 is not activated.

- The following example shows how to setup the VLAN interface with the "aggr-link=aggr1" LinkAggregation Group for activation after rebooting the system. ("IP address=192.168.151.1" is assigned to the VLAN interface "aggr2001" of "VID=2").:

1. Create the VLAN interface by dladm(1M) command.
2. Example (the VLAN interface "aggr2001" of "VID=2"):

```
# dladm create-vlan -l aggr1 -v 2
```

3. Define the relation between the IP address and the hostname in the /etc/inet/hosts file.

Example (Hostname is giga-lacp and its IP address is 192.168.150.1):

```
# cat /etc/hosts
192.168.151.1 giga-vlan
```

4. Setup the hostname and prefix length to aggr2001 by ipadm(1M) command.

Example (Hostname is giga-lacp and prefix length is 24):

```
# ipadm create-ip aggr2001
# ipadm create-addr -T static -a giga-vlan/24 aggr2001/v4static
```



Note

- Before creating a LinkAggregation Group, all interfaces to be assigned to the group must be in an inactive state.
- By using the dladm create-aggr command, the policy, the LACP mode and the LACP timer are set to default values ("L4 distribution", "off mode" and "short"). To set parameters to non-default values, it is necessary to change the LinkAggregation settings by using the dladm modify-aggr command. For more information about this command, please refer to ["4.2.1.3 Modify a LinkAggregation \(dladm modify-aggr\)"](#).
- After rebooting the system, the LinkAggregation settings remain effective.
- For more information about this command, please refer to the "man pages section 1M: System Administration Commands" of Oracle Documentation.

4.2.1.2 Delete a LinkAggregation (dladm delete-aggr)

This section explains the dladm delete-aggr command for inactivating LinkAggregation.

- Synopsis

- Solaris 10 8/07 or later

```
/usr/sbin/dladm delete-aggr key
```

key: Specify the key number to identify the LinkAggregation Group
Specify a number ranging from 1 to 999.

- Solaris 11

```
/usr/sbin/dladm delete-aggr aggr-link
```

aggr-link: The name of the representative interface.

- Description

Deletes a LinkAggregation Group.

- Exit Code

0: normal end.
>0: abnormal end.

- Example

Processes to inactivate a LinkAggregation Group are shown below.

1. Inactivate the LinkAggregation Group

- Solaris 10 8/07 or later

The following example shows how to inactivate the "key=1" LinkAggregation Group and stop the LinkAggregation (*1).
(IP address of the representative interface "aggr1" is deleted.):

```
# ifconfig aggr1 unplumb
```

1: If LinkAggregation Group has been setup to be activated after rebooting the system, please delete the descriptions in the /etc/hostname.aggr (*: instance number) and /etc/inet/hosts files defined in the activation of LinkAggregation Group section.

- Solaris 11

The following example shows how to inactivate the "aggr-link=aggr1" LinkAggregation Group and stop the LinkAggregation (*2).
(IP address of the representative interface "aggr1" is deleted.):

```
# ifconfig aggr1 unplumb
```

*2: If LinkAggregation Group has been setup to be activated after rebooting the system, please execute the following ipadm(1M) command and delete the descriptions in the /etc/inet/hosts files defined in the activation of LinkAggregation Group section.

```
# ipadm delete-ip aggr1
```

2. Delete the LinkAggregation Group

- Solaris 10 8/07 or later

The following example shows how to delete the "key=1" LinkAggregation Group (*3):

```
# /usr/sbin/dladm delete-aggr 1
```

*3: Before deleting the LinkAggregation Group, please inactivate the LinkAggregation Group and stop the LinkAggregation.

- Solaris 11

The following example shows how to delete the "aggr-link=aggr1" LinkAggregation Group (*4):

```
# /usr/sbin/dladm delete-aggr aggr1
```

*4: Before deleting the LinkAggregation Group, please inactivate the LinkAggregation Group and stop the LinkAggregation.



Note

- After rebooting the system, the LinkAggregation settings remain effective.
- For more information about this command, please refer to the "man pages section 1M: System Administration Commands" of Oracle Documentation.

4.2.1.3 Modify a LinkAggregation (dladm modify-aggr)

This section explains the dladm modify-aggr command for modifying LinkAggregation.

- Synopsis

- Solaris 10 8/07 or later

```
/usr/sbin/dladm modify-aggr [-P policy] [-l mode] [-T time] key
```

-P *policy*: Specify the policy (Data Distribution Mode). Policies can be combined as needed
L2: Distribution by MAC header
L3: Distribution by IP header
L4: Distribution by ULP (TCP, UDP, etc) header

-l *mode*: Specify the LACP mode
active: active mode
passive: passive mode
off: off mode

-T *time*: Specify the LACP timer
short: every one second
long: every 30 seconds

key: Specify the key number to identify the LinkAggregation Group
Specify a number ranging from 1 to 999.

- Solaris 11

```
/usr/sbin/dladm modify-aggr [-P policy] [-L mode] [-T time] aggr-link
```

-P *policy*: Specify the policy (Data Distribution Mode). Policies can be combined as needed
L2: Distribution by MAC header
L3: Distribution by IP header
L4: Distribution by ULP (TCP, UDP, etc) header

-L *mode*: Specify the LACP mode
active: active mode

```

passive: passive mode
off: off mode

-T time: Specify the LACP timer
        short: every one second
        long: every 30 seconds

aggr-link: The name of the representative interface.

```

- Description

Modifies a LinkAggregation Group.

- Exit Code

0: normal end.
>0: abnormal end.

- Example

Processes to modify the policy of a LinkAggregation Group are shown below.

- Solaris 10 8/07 or later

- The following example shows how to change the "key=1" LinkAggregation Group to "policy=L2":

```
# /usr/sbin/dladm modify-aggr -P L2 1
```

- Solaris 11

- The following example shows how to change the "aggr-link=aggr1" LinkAggregation Group to "policy=L2":

```
# /usr/sbin/dladm modify-aggr -P L2 aggr1
```

Processes to modify the LACP mode and LACP timer of a LinkAggregation Group are shown below.

- Solaris 10 8/07 or later

- The following example shows how to change the "key=1" LinkAggregation Group to "LACP mode=active, LACP timer=short":

```
# /usr/sbin/dladm modify-aggr -l active -T short 1
```

- Solaris 11

- The following example shows how to change the "aggr-link=aggr1" LinkAggregation Group to "LACP mode=active, LACP timer=short":

```
# /usr/sbin/dladm modify-aggr -L active -T short aggr1
```



Note

- It is not necessary to use this command if the desired policies are L4 distribution, LACP mode off, and LACP timer 'short'. LinkAggregation Groups are created with these default values.
- After rebooting the system, the LinkAggregation settings remain effective.
- For more information about this command, please refer to the "man pages section 1M: System Administration Commands" of Oracle Documentation.

4.2.1.4 Add Interfaces to a LinkAggregation (dladm add-aggr)

This section explains the `dladm add-aggr` command for adding interfaces to a LinkAggregation.

- Synopsis

- Solaris 10 8/07 or later

```
/usr/sbin/dladm add-aggr -d dev [-d dev] ... key
```

`-d dev`: Specify the name of the physical interface (including instance number) to belong to a LinkAggregation Group
You can specify devices belonging to the LinkAggregation Group until the number of them becomes 255.

`key`: Specify the key number to identify the LinkAggregation Group
Specify a number ranging from 1 to 999.

- Solaris 11

```
/usr/sbin/dladm add-aggr -l ether-linkdev [-l ether-linkdev...] aggr-link
```

`-l ether-linkdev`: Specify the name of the physical interface (including instance number) to belong to a LinkAggregation Group
You can specify devices belonging to the LinkAggregation Group until the number of them becomes 255.

`aggr-link`: The name of the representative interface.

- Description

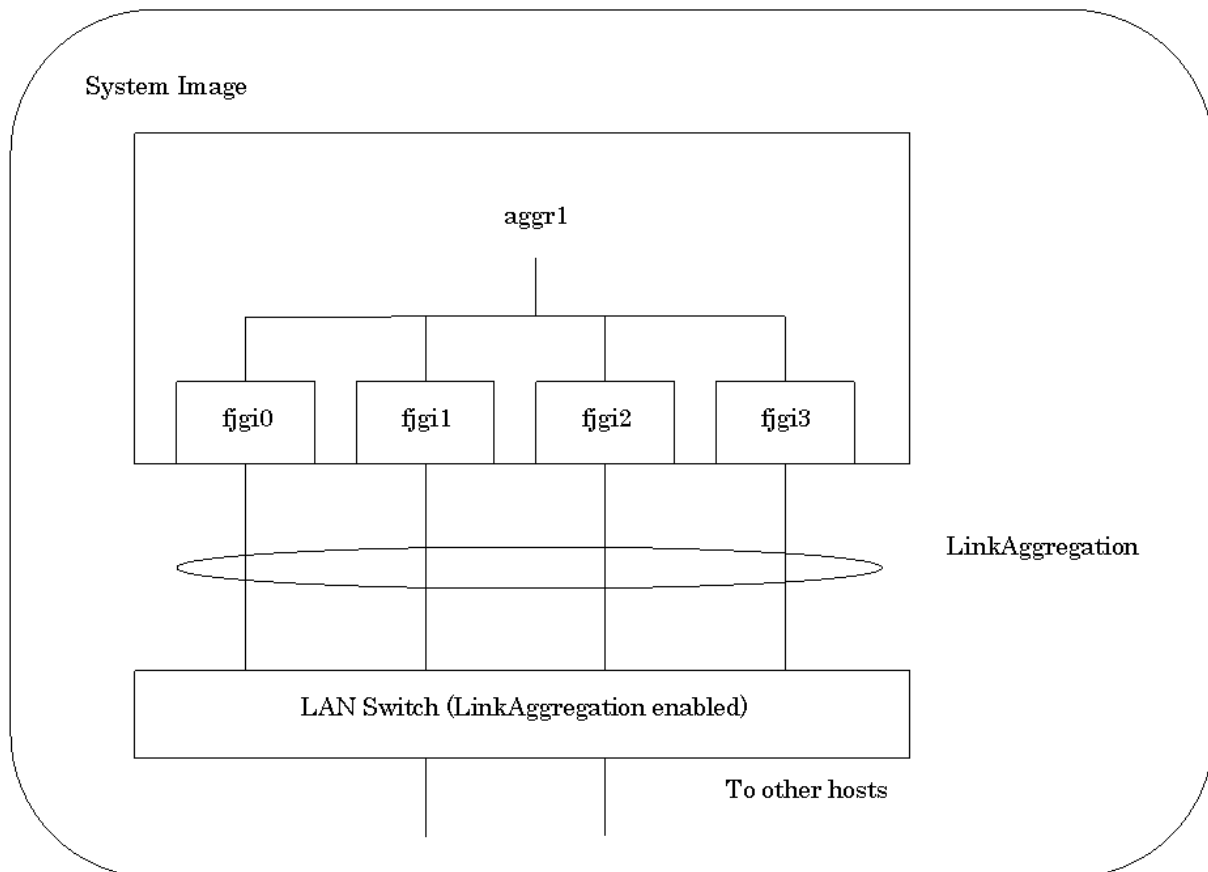
Adds interfaces to a LinkAggregation Group.

- Exit Code

0: normal end.
>0: abnormal end.

- Example

Processes to add interfaces to a LinkAggregation Group are shown below.



- **Solaris 10 8/07 or later**

- The following example shows how to add the interface "fjgi3" to the "key=1" LinkAggregation Group:

```
# /usr/sbin/dladm add-aggr -d fjgi3 1
```

- **Solaris 11**

- The following example shows how to add the interface "fjgi3" (this vanity name is net5) to the "agg-link=aggr1" LinkAggregation Group:

```
# /usr/sbin/dladm add-aggr -l net5 aggr1
```



Note

- If the LACP mode is off, do not use this command.
- After rebooting the system, the LinkAggregation settings remain effective.
- For more information about this command, please refer to the "man pages section 1M: System Administration Commands" of Oracle Documentation.

4.2.1.5 Remove Interfaces from a LinkAggregation (dladm remove-aggr)

This section explains the `dladm remove-aggr` command for removing interfaces from a LinkAggregation.

- Synopsis

- Solaris 10 8/07 or later

```
/usr/sbin/dladm remove-aggr -d dev [-d dev] ... key
```

-d dev: Specify the name of the physical interface (including instance number) to belong to a LinkAggregation Group

You can specify devices belonging to the LinkAggregation Group until the number of them becomes one.

key: Specify the key number to identify the LinkAggregation Group
Specify a number ranging from 1 to 999.

- Solaris 11

```
/usr/sbin/dladm remove-aggr -l ether-linkdev [-l ether-linkdev...] aggr-link
```

-l ether-linkdev: Specify the name of the physical interface (including instance number) to belong to a LinkAggregation Group

You can specify devices belonging to the LinkAggregation Group until the number of them becomes one.

aggr-link: The name of the representative interface.

- Description

Removes interfaces from a LinkAggregation Group.

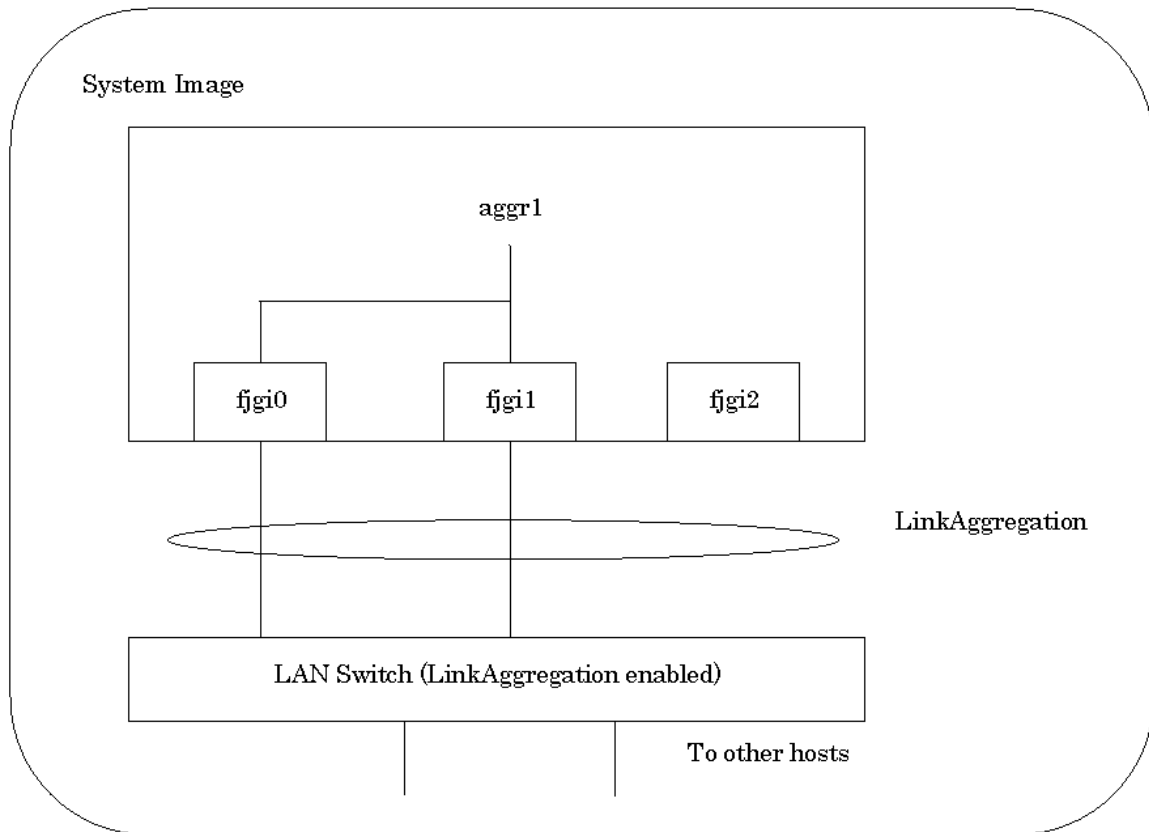
- Exit Code

0: normal end.

>0: abnormal end.

- Example

Processes to remove interfaces from a LinkAggregation Group are shown below.



- Solaris 10 8/07 or later

- The following example shows how to remove the interface "fjgi2" from the "key=1" LinkAggregation Group:

```
# /usr/sbin/dladm remove-aggr -d fjgi2 1
```

- Solaris 11

- The following example shows how to remove the interface "fjgi2"(this vanity name is net4) from the "aggr-link=aggr1" LinkAggregation Group:

```
# /usr/sbin/dladm remove-aggr -l net4 aggr1
```



Note

- If the LACP mode is off, do not use this command.
- After rebooting the system, the LinkAggregation settings remain effective.
- For more information about this command, please refer to the "man pages section 1M: System Administration Commands" of Oracle Documentation.

4.2.1.6 Display LinkAggregation Statistics and Information (dladm show-aggr)

This section explains the `dladm show-aggr` command for displaying statistics and information for LinkAggregation Groups.

- Synopsis

- Solaris 10 8/07 or later

```
/usr/sbin/dladm show-aggr [-s [-i interval]] [-L] [key]
```

-s: Specify to display the statistics.

-i interval: Specify the interval in seconds to report the statistics
(Differences from the preceding screen are displayed when statistics are displayed multiple times.)
Displays an accumulated value only once if the interval is omitted or 0 is specified.

-L: Specify to display detailed LinkAggregation Information

key: Specify the key number to identify the LinkAggregation Group
Specify a number ranging from 1 to 999.

Display the LinkAggregation Information when all options are omitted.

- Solaris 11

```
/usr/sbin/dladm show-aggr [-Lx] [aggr-link]
```

-L: Specify to display detailed LinkAggregation Information

-x: Specify to display extended LinkAggregation Information

aggr-link: The name of the representative interface.

Display the LinkAggregation Information when all options are omitted.



Note

LinkAggregation statistics can be displayed by dlstat(1M). For more information about the dlstat(1M) command, please refer to the "man pages section 1M: System Administration Commands" of Oracle Documentation.

- Description

Display statistics and information for LinkAggregation Groups.

- Exit Code

0: normal end.

>0: abnormal end.

- Example

Processes to display the statistics and LinkAggregation Information of LinkAggregation Groups are shown below.

- Solaris 10 8/07 or later

- The following example shows how to display the LinkAggregation Information for the "key=1" LinkAggregation Group:

```
# /usr/sbin/dladm show-aggr 1
key: 1 (0x0001) policy: L4      address: 0:0:77:9f:3e:d5 (auto)
  device    address          speed    duplex  link  state
  fjgi1     0:0:77:9f:3e:d5    1000 Mbps full    up     standby
  fjgi2     0:0:77:9f:3e:d6    1000 Mbps full    up     standby
  fjgi3     0:0:77:9f:3e:d7    1000 Mbps full    up     standby
```

- The following example shows how to display the detailed LinkAggregation Information for the "key=1" LinkAggregation Group:

```
# /usr/sbin/dladm show-aggr -L 1
key: 1 (0x0001) policy: L4 address: 0:0:77:9f:3c:d5 (auto)
      LACP mode: active LACP timer: short
      device activity timeout aggregatable sync coll dist defaulted expired
fjgi1 active short yes yes yes yes no no
fjgi2 active short yes yes yes yes no no
fjgi3 active short yes yes yes yes no no
```

- The following example shows how to display the statistics for the "key=1" LinkAggregation Group:

```
# /usr/sbin/dladm show-aggr -s 1
key: 1 ipackets rbytes opackets obytes %ipkts %opkts
Total 2474 245586 0 0 50.0 -
fjgi1 1237 122793 0 0 50.0 -
fjgi2 1237 122793 0 0 50.0 -
fjgi3 0 0 0 0 0.0 -
```

- Solaris 11

- The following example shows how to display the LinkAggregation Information for the "aggr-link=aggr1" LinkAggregation Group:

```
# dladm show-aggr aggr1
LINK POLICY ADDRPOLICY LACPACTIVITY LACPTIMER FLAGS
aggr1 L4 auto active short -----
```

- The following example shows how to display the detailed LinkAggregation Information for the " aggr-link=aggr1" LinkAggregation Group:

```
# dladm show-aggr -L aggr1
LINK PORT AGGREGATABLE SYNC COLL DIST DEFAULTED EXPIRED
aggr1 net2 yes yes yes yes no no
-- net3 yes yes yes yes no no
-- net4 yes yes yes yes no no
```

*: net2, net3, and net4 are the vanity name of fjgi0, fjgi1, and fjgi2, respectively.

- The following example shows how to display the extended LinkAggregation Information for the " aggr-link=aggr1" LinkAggregation Group:

```
# dladm show-aggr -x aggr1
LINK PORT SPEED DUPLEX STATE ADDRESS PORTSTATE
aggr1 -- 1000Mb full up 0:0:77:9f:3e:d5 --
net2 1000Mb full up 0:0:77:9f:3e:d5 attached
net3 1000Mb full up 0:0:77:9f:3e:d6 attached
net4 1000Mb full up 0:0:77:9f:3e:d7 attached
```

*: net2, net3, and net4 are the vanity name of fjgi0, fjgi1, and fjgi2, respectively.

Information

- The following example shows how to display the statistics for the " aggr-link=aggr1" LinkAggregation Group:

```
# dlstat show-aggr aggr1
LINK PORT IPKTS RBYTES OPKTS OBYTES
aggr1 -- 371 47.73K 447 56.96K
aggr1 net2 125 16.09K 152 19.20K
```

aggr1	net3	124	16.03K	147	18.82K
aggr1	net4	122	15.62K	148	18.94K

*: net2, net3, and net4 are the vanity name of fjgi0, fjgi1, and fjgi2, respectively.



Note

- For more information about this command, please refer to the "man pages section 1M: System Administration Commands" of Oracle Documentation.

4.3 Notes

This section explains notes for using the LinkAggregation function.

- Only TCP/IP connection is supported.
- If a VLAN interface is made with the LinkAggregation feature, the following must be satisfied.

```
(The number of VLAN interfaces) * (the number of physical interfaces in group) * (the number of groups) <= 1024
```

If this is not satisfied, the system may not work correctly due to lack of memory resource.

- The link speed must be the same among the member interfaces in a LinkAggregation Group, and duplex mode must be set to full.
- In a cluster system, fail-over of LinkAggregation interfaces on a public LAN is not supported.
- When the interfaces are connected to a LAN switch, it is necessary to enable the LinkAggregation function on the LAN switch. For more information about the LAN switch and the LinkAggregation function, please refer to the specifications of each LAN switch.
- It is necessary to inactivate corresponding LinkAggregation Groups with the ifconfig(1M) command before DR (Dynamic Reconfiguration) or PCI Hot Plug is performed.
- It is necessary to activate corresponding LinkAggregation Groups with the ifconfig(1M) command after DR or PCI Hot Plug is completed.
- VLAN interfaces can not be specified directly as interfaces belonging to the LinkAggregation Group. It is necessary to create the VLAN interface for the aggregated interface by the usual VLAN interface creation procedure (ifconfig(1M) command or dladm(1M) command (Solaris 11 only), etc) to use the VLAN interface with LinkAggregation.

Chapter 5 Troubleshooting

The following should be checked first to troubleshoot a problem.

Is the driver software installed correctly?

If the "pkginfo -x FJSVgid" command does not return output, the driver package is not installed. If this occurs, install the driver package using the driver CD-ROM attached to the Gigabit Ethernet card or downloading from the following URL.

<https://updatesite.jp.fujitsu.com/unix/en/download/driver/index.html>

Refer to the "Installation Guide FUJITSU PCI GigabitEthernet 4.1 Update2 or 5.0" manual for details.

Does the system recognize the Gigabit Ethernet card?

If the "prtconf -pv | grep FJSV" command does not return any string having "FJSV,e2sa" (SE0X7GD2X), "FJSV,e2ta" (SE0X7GD1X), "FJSV,e4ta" (SE0X7GQ1X) or "FJSV,e4tb" (SE0X7GQ2X), OBP (Open Boot PROM) on the system is not recognizing the Gigabit Ethernet card properly. Check whether the physical interface is properly installed on the system.

Do the LEDs on the Gigabit Ethernet card indicate proper operation status?

Check the following items if the LEDs indicate the link status is abnormal. See also "[Appendix B Gigabit Ethernet Card LED Diagnosis](#)" for detailed information.

Check Item	Recommended Action
Cable	Replace the cable.
Gigabit Ethernet card installation state	Affix the Gigabit Ethernet card to the PCI Express slot of the system securely.
Gigabit Ethernet card hardware	Replace the Gigabit Ethernet card.
Cable connection to the Gigabit Ethernet card and the switch	Connect the cable to the devices securely.
Power status of the Gigabit Ethernet switch	Check the power of the switch.
Connection port of the switch	Change the connection port of the switch.
Switch configuration	Check the switch configuration.
fjgi.conf file	Check the fjgi.conf file or change the file to default.
Operation mode by dladm(1M) command	Check the operation mode by dladm(1M) command or change the operation mode to default. (Solaris 11 only)
Driver package installation status	Re-install the driver package from the driver CD-ROM attached to the Gigabit Ethernet card or at the FUJITSU download web site.

Appendix A Messages

This chapter explains messages displayed by the FUJITSU PCI GigabitEthernet driver.

A.1 Console Messages from the Driver

Messages from the FUJITSU PCI GigabitEthernet driver are listed in the following table.

Table A.1 Console Messages(NOTICE) from the FUJITSU PCI GigabitEthernet Driver

No	Message	Cause	Workaround
1	free send descriptor failed ([detail])	Freeing of the descriptor to send failed.	Please report this error to your service provider.
2	(Other messages)	There is a possibility of driver internal bug or hardware failure.	Report the error to your service provider.

Table A.2 Console Messages(WARNING) from the FUJITSU PCI GigabitEthernet Driver

No	Message	Cause	Workaround
1	soft state alloc failed.	Allocating of the memory resource failed.	Installed physical memory may be insufficient. If this is not the cause, report this error to your service provider.
2	Allocation of descriptor memory failed	The driver could not allocate internal resources for DMA.	Installed physical memory may be insufficient. If this is not the cause, report this error to your service provider.
3	Could not allocate DMA handle	The driver could not allocate DMA resources.	
4	Could not bind descriptor memory		
5	Multiple fragments in descriptor area	An error was found in message fragmentation.	Re-activate the interface. If this message is still displayed, report to your service provider.
6	Unable to map adapter registers.	Mapping of the adapter registers failed.	Installed physical memory may be insufficient. If this is not the cause, report this error to your service provider.
7	ddi_get_iblock_cookie-ERROR	The driver could not allocate interrupt resources.	
8	Unable to install interrupt routine.		
9	ATTACH failed	The driver was not loaded to the kernel successfully.	
10	Duplex are invalid !! Please change the partner's duplex Full.	With SE0X7GD2X, the remote device is using half duplex mode.	With SE0X7GD2X, only full duplex is available. Change the duplex mode of the remote device to Full.
11	Identify failed.	Identification of the interface information failed.	Check whether the system is supported. If the system is supported, there is a possibility of hardware abnormalities. Please replace the adapter.
12	ddi_intr_block_enable failed	Enabling of the interrupt failed.	Try re-enabling the driver. If this message is still displayed, report to your service provider.
13	ddi_intr_enable failed		
14	ATTACH failed ([detail])	Loading of the driver failed.	Installed physical memory may be insufficient. If this is not the cause, report this error to your service provider.

No	Message	Cause	Workaround
15	DETACH failed ([detail])	Unloading of the driver failed.	After disabling the driver, re-do the process (disconnect in Dynamic Reconfiguration, etc.) If this message is still displayed, report to your service provider.
16	failed to allocate([detail])	Allocating of the memory resource failed.	Installed physical memory may be insufficient. If this is not the cause, report this error to your service provider.
17	ddi_dma_alloc_handle failed([detail])	Allocating of the DMA resource failed.	
18	ddi_dma_addr_bind_handle failed([detail])		
19	(Other messages)	There is a possibility of driver internal bug or hardware failure.	Report the error to your service provider.

Table A.3 Console Messages from the FUJITSU PCI GigabitEthernet Driver

No	Message	Cause	Workaround
1	network connection down	Link is down	Check the cable connection and the switch configuration.
2	network connection up using portA autonegotiation:[A] speed: [B] flowctrl: [C] duplex mode: [D] (role: [E]) (*1)	<p>Link has become up</p> <p>[A] yes: Auto-Negotiation is on no: Auto-Negotiation is off</p> <p>[B] 1000: Transmitting and receiving data at 1000Mbps 100: Transmitting and receiving data at 100Mbps 10: Transmitting and receiving data at 10Mbps</p> <p>[C] symmetric: Send/accept Flowcontrol requests to/from the remote device. remote send: Does not send Flowcontrol request. Only accept Flowcontrol requests from the remote device. local send: Only send Flowcontrol requests. Does not accept Flowcontrol requests from the remote device. none: Disabled</p> <p>[D] full: Transmitting and receiving data in full duplex mode half: Transmitting and receiving data in half duplex mode</p> <p>[E]</p>	There is no problem.

No	Message	Cause	Workaround
		Master: Communicating as Master Slave: Communicating as Slave	
3	Illegal value for [ParameterName]	An error was found with a parameter defined in the fjgi.conf file.	Check whether the value is set correctly in the file.
4	fail to ddi_dma_bind_handle	The driver could not allocate DMA resources.	Installed physical memory may be insufficient. If this is not the cause, report this error to your service provider.
5	fail to FragCount	An error was found in message fragmentation.	Re-activate the interface. If this message is still displayed, report to your service provider.
6	fjgi_param_register error	The driver could not allocate resources for the ndd parameter.	Installed physical memory may be insufficient. If this is not the cause, report this error to your service provider.
7	fjgi_board_alloc_mem failed !!	The driver could not allocate resources.	
8	Error filling TX ring	The driver could not allocate transmit resources.	
9	status block can't alloced!	The driver could not allocate status information resources.	
10	status block can't alloced handle!		
11	status block can't bind handle!		
12	fjgi_board_init_mem: Failed to dma_alloc !!	The driver could not allocate DMA resources.	
13	statistic block can't alloced!	The driver could not allocate statistic information resources.	
14	hwmb block can't alloced handle!		
15	hwmb block can't bind handle!		
16	fjgi_board_init_mem: Failed to dma alloc2!!	The driver could not allocate DMA resources.	
17	Illegal value for LinkSpeed_A	The value of LinkSpeed_A in the configuration file is incorrect.	Set the correct value for LinkSpeed_A.
18	fjgi_hw_init:Step 22 failed	An error occurred during initialization of the adapter.	A hardware failure occurred. Please contact your service provider.
19	fjgi_hw_init:Step 23 failed		
20	fjgi_hw_init:Step 43 failed		
21	Can't judge T or SX !!	The adapter type cannot be recognized.	Check whether the server is supported. If the system is supported, there is a possibility of hardware abnormalities. Please replace the adapter.
22	(Other messages)	There is a possibility of driver internal bug or hardware failure.	Report the error to your service provider.

*1: This appears only when SE0X7GD1X/SE0X7GQ1X/SE0X7GQ2X are used in 1000Mbps environments.

Messages which are reported remotely by the Machine Administration function included in Enhanced Support Facility are listed in the following table.

Table A.4 Messages Reported by Machine Administration

No	Message	Meaning	Workaround
1	fjgi_device_check: fjgi_hw_deinit failed !	An error occurred during initialization of the adapter.	The version number of the driver may not support this hardware. Please apply any applicable patches described in the Installation Guide. If the problem persists, there is a possibility of hardware abnormalities. Please replace the adapter.
2	fjgi_device_check: fjgi_hw_init failed !	An error occurred during initialization of the adapter.	There is a possibility of hardware abnormalities. Please replace the adapter.
3	pci_config_setup_failed	The driver could not allocate sufficient PCI configuration space.	There is a possibility of a resource shortage or hardware abnormalities. Please check the memory usage and adapter installation status.
4	Autonegotiation_failed	The Auto-Negotiation of 1000BASE-SX failed.	Check the transmission mode and the adapter hardware.

Appendix B Gigabit Ethernet Card LED Diagnosis

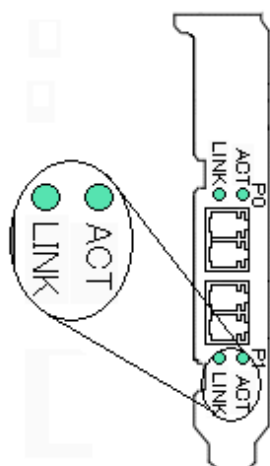
This appendix explains the LED diagnosis function of Gigabit Ethernet cards.

B.1 Location and Meaning of the LEDs

- Location of the LEDs (SE0X7GD2X)

The following figure shows the location of the LEDs on SE0X7GD2X.

Figure B.1 1000Base-SX * 2ports (SE0X7GD2X)



- Meaning of the LEDs (SE0X7GD2X)

The following tables show the meaning of each LED.

LINK LED indicates the following operation status.

LINK LED	Description
ON (Green)	The card is connected to a 1000Mbps network and is ready to communicate.
OFF	The card is not connected to a 1000Mbps network.

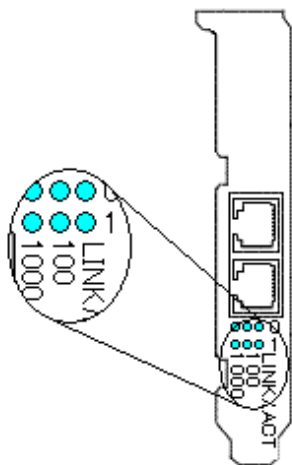
ACT LED indicates the following operation status.

ACT LED	Description
ON (Green)	The card is transmitting or receiving network data.
OFF	The card is not transmitting or receiving network data.

- Location of the LEDs (SE0X7GD1X)

The following figures show the location of the LEDs on SE0X7GD1X.

Figure B.2 10/100/1000Base-T * 2ports (SE0X7GD1X)



- Meaning of the LEDs (SE0X7GD1X)

The following tables show the meaning of each LED.

1000M LED indicates the following operation status.

1000M LED	Description
ON (Green)	The card is connected to a 1000Mbps network and is ready to communicate.
OFF	The card is not connected to a 1000Mbps network.

100M LED indicates the following operation status.

100M LED	Description
ON (Green)	The card is connected to a 100Mbps network and is ready to communicate.
OFF	The card is not connected to a 100Mbps network.

LINK/ACT LED indicates the following operation status.

LINK/ACT LED	Description
ON (Green)	The card is connected to a 1000Mbps, 100Mbps or 10Mbps network and is ready to communicate.
BLINKING (Green)	The card is transmitting or receiving network data.
OFF	The card is not connected to a 1000Mbps, 100Mbps or 10Mbps network, and the card is not transmitting or receiving network data.

- Location of the LEDs (SE0X7GQ1X/SE0X7GQ2X)

The following figures show the location of the LEDs on SE0X7GQ1X and SE0X7GQ2X.

Figure B.3 10/100/1000Base-T * 4ports (SE0X7GQ1X)

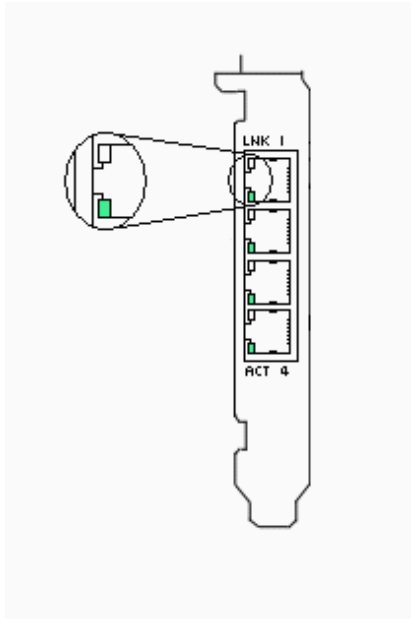
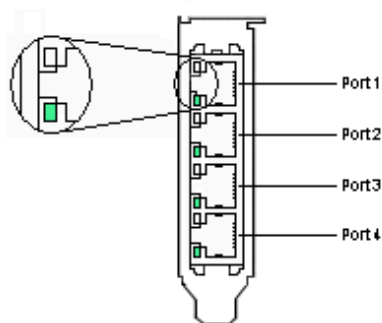


Figure B.4 10/100/1000Base-T * 4ports (SE0X7GQ2X)



- Meaning of the LEDs (SE0X7GQ1X/SE0X7GQ2X)

The following tables show the meaning of each LED.

LINK LED (White LED in Figure B.3/B.4) indicates the following operation status.

LINK LED	Description
ON (Amber)	The card is connected to a 1000Mbps network and is ready to communicate.
ON (Green)	The card is connected to a 100Mbps network and is ready to communicate.
OFF	The card is connected to a 10Mbps network and is ready to communicate, or the card is not connected to a network.

ACT LED (Green LED in Figure B.3/B.4) indicates the following operation status.

ACT LED	Description
ON (Green)	The card is transmitting or receiving network data.
OFF	The card is not transmitting or receiving network data.

Appendix C Using FUJITSU PCI GigabitEthernet in a Cluster Environment

This Appendix outlines the supported functions and setup procedure for the FUJITSU PCI GigabitEthernet 4.1 or later or the FUJITSU PCI GigabitEthernet 5.0 or later interface when used in a cluster environment (PRIMECLUSTER).

C.1 Cluster Environment Support

The FUJITSU PCI GigabitEthernet 4.1 or later or the FUJITSU PCI GigabitEthernet 5.0 or later driver support the following cluster features.

- Operation standby mode
- 1:n operation standby mode
- Mutual standby mode
- TCP/IP communication (public LAN)
- A VLAN interface can not be used as a cluster interconnect.
- The JumboFrame function can be used as a cluster interconnect. When you change MTU from a default value (9000), please set up by the fjgi.conf file or dladm(1M) command (Solaris 11 only). For details, please refer to "Method 2: Specify in fjgi.conf" or "Method 3: Specify in dladm(1M) command" (Solaris 11 only) of "[3.5.2 JumboFrame Setup](#)".

The following table shows the supported failover mode for an office LAN.

Failover Mode	Support Status
IP address	Supported
MAC address	Supported (*1)
IP address + MAC address	Supported (*1)

*1: Supported by PRIMECLUSTER 4.1A10 or later.

C.2 Cluster Environment Setup Procedure

Set up the cluster environment in the same way as an Ethernet driver (i.e. bge driver). Follow "Setting up the Network" in the PRIMECLUSTER manual.

Note that the FUJITSU PCI GigabitEthernet driver resource name is "fjgi".

C.3 Notes

- "PRIMECLUSTER 4.1 or later" is required when using the FUJITSU PCI GigabitEthernet driver. If an earlier version of cluster software is used, FUJITSU PCI GigabitEthernet driver cannot be used as the cluster interconnect or for IP address fail-over for an office LAN.
- A FUJITSU PCI GigabitEthernet interface used as a VLAN interface cannot be used as the cluster interconnect.

Appendix D Using FUJITSU PCI GigabitEthernet in Solaris Containers

This Appendix outlines the supported functions and setup procedure for the FUJITSU PCI GigabitEthernet 4.1 or later or the FUJITSU PCI GigabitEthernet 5.0 or later interface when used in Solaris Containers.

D.1 Solaris Containers Support

The FUJITSU PCI GigabitEthernet 4.1 or later or the FUJITSU PCI GigabitEthernet 5.0 or later driver supports the following features in Solaris Containers.

- Global Zone
- Non-Global Zones(Shared-IP Non-Global Zones and Exclusive-IP Non-Global Zones)

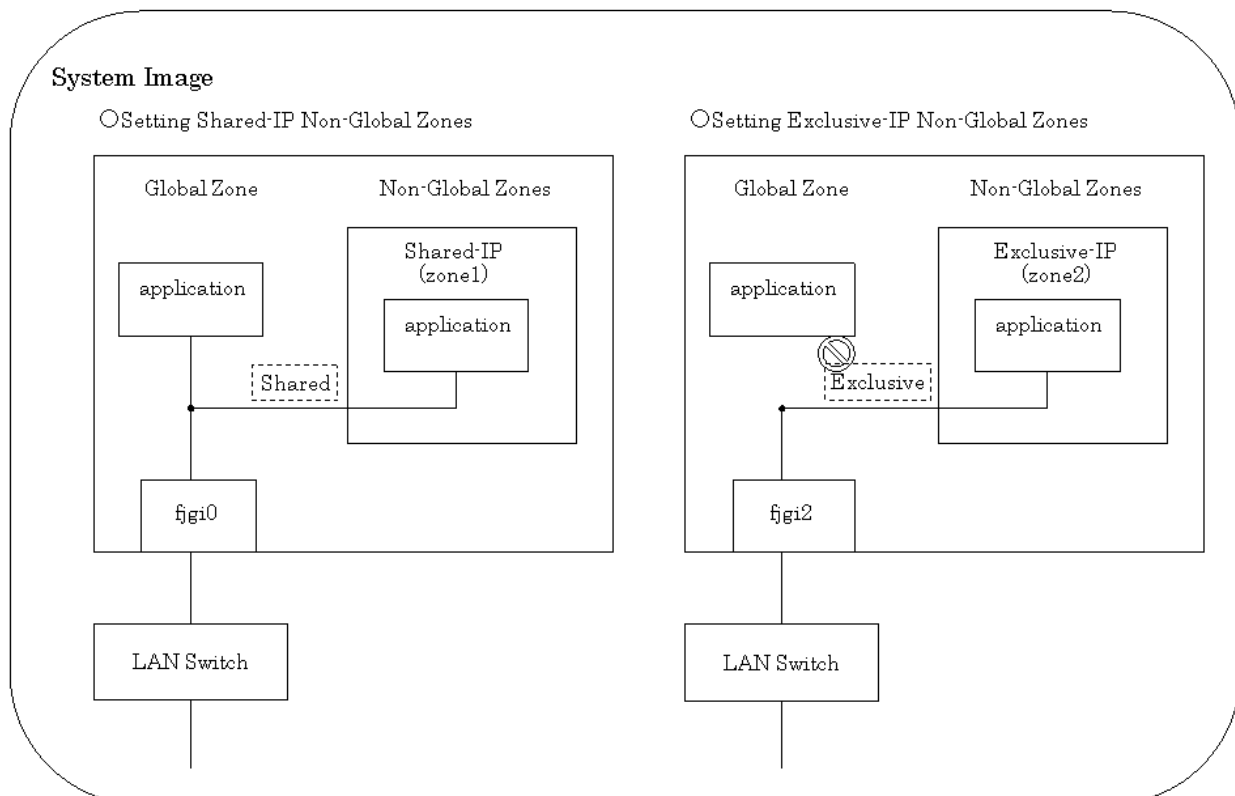
Note: Shared-IP Non-Global Zones are available in Solaris 10 3/05 or later.

Exclusive-IP Non-Global Zones are available in Solaris 10 8/07 or later.

D.2 Solaris Containers Setup Procedure

Setup the Solaris Containers environment. For more information about the Solaris Containers environment, please refer to "System Administration Guide: Solaris Containers-Resource Management and Solaris Zones" of Oracle Documentation.

The examples below show the setting methods for Shared-IP Non-Global Zones and Exclusive-IP Non-Global Zones.



- The following example shows how to add an interface to a Shared-IP Non-Global Zone (zonecfg add net)

```
zonecfg -z zonename                                (Specify Zone Name.)
zonecfg:zonename> set ip-type=shared                (Specify Shared-IP Non-Global Zone.)
```

```

zonecfg:zonename> add net                                (Begin adding network.)
zonecfg:zonename:net> set address=IP-address/prefixlen (Specify IP address and prefix length.)
zonecfg:zonename:net> set physical=Interface            (Specify network interface.)
zonecfg:zonename:net> end                                (Finish adding network.)
zonecfg:zonename> exit                                   (End of command.)

```

Example: Adding fjgi0 to a Shared-IP Non-Global Zone (zone1).

```

# zonecfg -z zone1
zonecfg:zone1> set ip-type=shared
zonecfg:zone1> add net
zonecfg:zone1:net> set address=192.168.150.1/24
zonecfg:zone1:net> set physical=fjgi0
zonecfg:zone1:net> end
zonecfg:zone1> exit

```

(Note 1) In Solaris 11, zonecfg create -b command must be executed to create a Shared-IP Non-Global Zone.

(Note 2) In Solaris 11, the vanity name (net2) is specified as fjgi0.

(Note 3) Reboot the Shared-IP Non-Global Zone to make this setting effective.

If the Shared-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Shared-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

- The following example shows how to remove an interface from a Shared-IP Non-Global Zone (zonecfg remove net)

```

zonecfg -z zonename                                (Specify Zone Name.)
zonecfg:zonename> remove net address=IP-address    (Specify IP address.)
zonecfg:zonename> exit                              (End of command.)

```

Example: Removing fjgi0 from a Shared-IP Non-Global Zone (zone1).

```

# zonecfg -z zone1
zonecfg:zone1> remove net address=192.168.150.1
zonecfg:zone1> exit

```

(Note) Reboot the Shared-IP Non-Global Zone to make this setting effective.

If the Shared-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Shared-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

- The following example shows how to add an interface to an Exclusive-IP Non-Global Zone (zonecfg set ip-type/zonecfg add net)

```

zonecfg -z zonename                                (Specify Zone Name.)
zonecfg:zonename> set ip-type=exclusive            (Specify Exclusive-IP Non-Global Zone.)
zonecfg:zonename> add net                            (Begin adding network.)
zonecfg:zonename:net> set physical=Interface        (Specify network interface.)
zonecfg:zonename:net> end                            (Finish adding network.)
zonecfg:zonename> exit                              (End of command.)

```

Example: Adding fjgi2 to an Exclusive-IP Non-Global Zone (zone2).

```

# zonecfg -z zone2
zonecfg:zone2> set ip-type=exclusive
zonecfg:zone2> add net
zonecfg:zone2:net> set physical=fjgi2
zonecfg:zone2:net> end
zonecfg:zone2> exit

```

(Note 1) In Solaris 11, the vanity name (net4) is specified as fjgi2.
(Note 2) Reboot the Exclusive-IP Non-Global Zone to make this setting effective.
If the Exclusive-IP Non-Global Zone has not booted, execute the following command.
zoneadm -z zonename boot
If the Exclusive-IP Non-Global Zone has booted, execute the following command.
zoneadm -z zonename reboot

- The following example shows how to remove an interface from an Exclusive-IP Non-Global Zone (zonecfg remove net)

```
zonecfg -z zonename (Specify Zone Name.)
zonecfg:zonename> remove net physical=Interface (Specify network interface.)
zonecfg:zonename> exit (End of command.)
```

Example: Removing fjgi2 from an Exclusive-IP Non-Global Zone (zone2).

```
# zonecfg -z zone2
zonecfg:zone2> remove net physical=fjgi2
zonecfg:zone2> exit
```

(Note 1) In Solaris 11, the vanity name (net4) is specified as fjgi2.
(Note 2) Reboot the Exclusive-IP Non-Global Zone to make this setting effective.
If the Exclusive-IP Non-Global Zone has not booted, execute the following command.
zoneadm -z zonename boot
If the Exclusive-IP Non-Global Zone has booted, execute the following command.
zoneadm -z zonename reboot

D.3 Notes

- When a VLAN interface is used in Shared-IP Non-Global Zones, please make the VLAN interface for the fjgi interface in the Global Zone with the VLAN interface creation procedure (ifconfig(1M) command or dladm(1M) command (Solaris 11 only), etc).

Example: Adding fjgi1000 to a Shared-IP Non-Global Zone (zone1).

- **Solaris 10 8/07 or later**

Execute the following commands in the Global Zone.

```
# ifconfig fjgil000 plumb
# zonecfg -z zone1
zonecfg:zone1> set ip-type=shared
zonecfg:zone1> add net
zonecfg:zone1:net> set address=192.168.160.1/24
zonecfg:zone1:net> set physical=fjgil000
zonecfg:zone1:net> end
zonecfg:zone1> exit
```

(Note) Reboot the Shared-IP Non-Global Zone to make this setting effective.
If the Shared-IP Non-Global Zone has not booted, execute the following command.
zoneadm -z zonename boot
If the Shared-IP Non-Global Zone has booted, execute the following command.
zoneadm -z zonename reboot

- **Solaris 11**

Execute the following commands in the Global Zone.

```
# dladm create-vlan -l net2 -v 1
# zonecfg -z zone1
zonecfg:zone1> set ip-type=shared
zonecfg:zone1> add net
zonecfg:zone1:net> set address=192.168.160.1/24
```

```
zonecfg:zone1:net> set physical=net1002
zonecfg:zone1:net> end
zonecfg:zone1> exit
```

(Note 1) zonecfg create -b command must be executed to create a Shared-IP Non-Global Zone.

(Note 2) net2 is the vanity name of fjgi0.

(Note 3) Reboot the Shared-IP Non-Global Zone to make this setting effective.

If the Shared-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Shared-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

- When a LinkAggregation is used in Shared-IP Non-Global Zones, please make the LinkAggregation Group for the fjgi interface in the Global Zone with the LinkAggregation creation procedure written in "[Chapter 4 LinkAggregation Feature](#)".

- Solaris 10 8/07 or later

Example: Adding aggr1 which is a LinkAggregation Group with fjgi0, fjgi1, fjgi2 and key=1 to a Shared-IP Non-Global Zone (zone1).

Execute the following commands in the Global Zone.

```
# /usr/sbin/dladm create-aggr -d fjgi0 -d fjgi1 -d fjgi2 1
# ifconfig aggr1 plumb
# zonecfg -z zone1
zonecfg:zone1> set ip-type=shared
zonecfg:zone1> add net
zonecfg:zone1:net> set address=192.168.160.1/24
zonecfg:zone1:net> set physical=aggr1
zonecfg:zone1:net> end
zonecfg:zone1> exit
```

(Note) Reboot the Shared-IP Non-Global Zone to make this setting effective.

If the Shared-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Shared-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

- Solaris 11

Example: Adding aggr1 which is a LinkAggregation Group with fjgi0 (this vanity name is net2), fjgi1 (this vanity name is net3), fjgi2 (this vanity name is net4) to a Shared-IP Non-Global Zone (zone1).

Execute the following commands in the Global Zone.

```
# /usr/sbin/dladm create-aggr -l net2 -l net3 -l net4 aggr1
# ifconfig aggr1 plumb
# zonecfg -z zone1
zonecfg:zone1> set ip-type=shared
zonecfg:zone1> add net
zonecfg:zone1:net> set address=192.168.160.1/24
zonecfg:zone1:net> set physical=aggr1
zonecfg:zone1:net> end
zonecfg:zone1> exit
```

(Note 1) zonecfg create -b command must be executed to create a Shared-IP Non-Global Zone.

(Note 2) Reboot the Shared-IP Non-Global Zone to make this setting effective.

If the Shared-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Shared-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

- When a VLAN interface is used in Exclusive-IP Non-Global Zones, please add a VLAN interface of the fjgi interface to the Exclusive-IP Non-Global Zones in the Global Zone, and then make the VLAN interface active using the ifconfig(1M) command in the Exclusive-IP Non-Global Zones.

Example: Adding fjgi1002 to an Exclusive-IP Non-Global Zone (zone2).

- Solaris 10 8/07 or later

1. Execute the following commands in the Global Zone.

```
# ifconfig fjgi1002 plumb
# zonecfg -z zone2
zonecfg:zone2> set ip-type=exclusive
zonecfg:zone2> add net
zonecfg:zone2:net> set physical=fjgi1002
zonecfg:zone2:net> end
zonecfg:zone2> exit
```

(Note) Reboot the Exclusive-IP Non-Global Zone to make this setting effective.

If the Exclusive-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Exclusive-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

2. Execute the following command in the Exclusive-IP Non-Global Zone.

```
# ifconfig fjgi1002 plumb 192.168.170.1 up
```

- Solaris 11

1. Execute the following commands in the Global Zone.

```
# dladm create-vlan -l net4 -v 1
# zonecfg -z zone2
zonecfg:zone2> set ip-type=exclusive
zonecfg:zone2> add net
zonecfg:zone2:net> set physical=net1004
zonecfg:zone2:net> end
zonecfg:zone2> exit
```

(Note1) net4 is the vanity name of fjgi2.

(Note2) Reboot the Exclusive-IP Non-Global Zone to make this setting effective.

If the Exclusive-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Exclusive-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

2. Execute the following command in the Exclusive-IP Non-Global Zone.

```
# ifconfig net1004 plumb 192.168.170.1 up
```

- When a LinkAggregation is used in Exclusive-IP Non-Global Zones, please make the LinkAggregation Group in the Global Zone with the creation procedure in "[Chapter 4 LinkAggregation Feature](#)". Also add the representative LinkAggregation interface to the Exclusive-IP Non-Global Zones, and then make the representative LinkAggregation interface active using the ifconfig(1M) command in the Exclusive-IP Non-Global Zones.

- Solaris 10 8/07 or later

Example: Adding aggr2 which is a LinkAggregation Group with fjgi0, fjgi1, fjgi2 and key=2 to an Exclusive-IP Non-Global Zone (zone2).

1. Execute the following commands in the Global Zone.

```
# /usr/sbin/dladm create-aggr -d fjgi0 -d fjgi1 -d fjgi2 2
# zonecfg -z zone2
zonecfg:zone2> set ip-type=exclusive
zonecfg:zone2> add net
zonecfg:zone2:net> set physical=aggr2
zonecfg:zone2:net> end
zonecfg:zone2> exit
```

(Note) Reboot the Exclusive-IP Non-Global Zone to make this setting effective.

If the Exclusive-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Exclusive-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

2. Execute the following command in the Exclusive-IP Non-Global Zone.

```
# ifconfig aggr2 plumb 192.168.170.1 up
```

- Solaris 11

Example: Adding aggr2 which is a LinkAggregation Group with fjgi0 (this vanity name is net2), fjgi1 (this vanity name is net3), fjgi2 (this vanity name is net4) to an Exclusive-IP Non-Global Zone (zone1).

1. Execute the following commands in the Global Zone.

```
# /usr/sbin/dladm create-aggr -l net2 -l net3 -l net4 aggr2
# zonecfg -z zone2
zonecfg:zone2> set ip-type=exclusive
zonecfg:zone2> add net
zonecfg:zone2:net> set physical=aggr2
zonecfg:zone2:net> end
zonecfg:zone2> exit
```

(Note) Reboot the Exclusive-IP Non-Global Zone to make this setting effective.

If the Exclusive-IP Non-Global Zone has not booted, execute the following command.

```
# zoneadm -z zonename boot
```

If the Exclusive-IP Non-Global Zone has booted, execute the following command.

```
# zoneadm -z zonename reboot
```

2. Execute the following command in the Exclusive-IP Non-Global Zone.

```
# ifconfig aggr2 plumb 192.168.170.1 up
```

- For more information about Solaris Containers, please refer to "System Administration Guide: Solaris Containers-Resource Management and Solaris Zones" of Oracle Documentation.

Appendix E Using FUJITSU PCI GigabitEthernet in Oracle VM Server for SPARC

This Appendix outlines the supported functions and setup procedure for the FUJITSU PCI GigabitEthernet 4.1 or later or the FUJITSU PCI GigabitEthernet 5.0 or later interface when used in Oracle VM Server for SPARC.

E.1 Oracle VM Server for SPARC Support

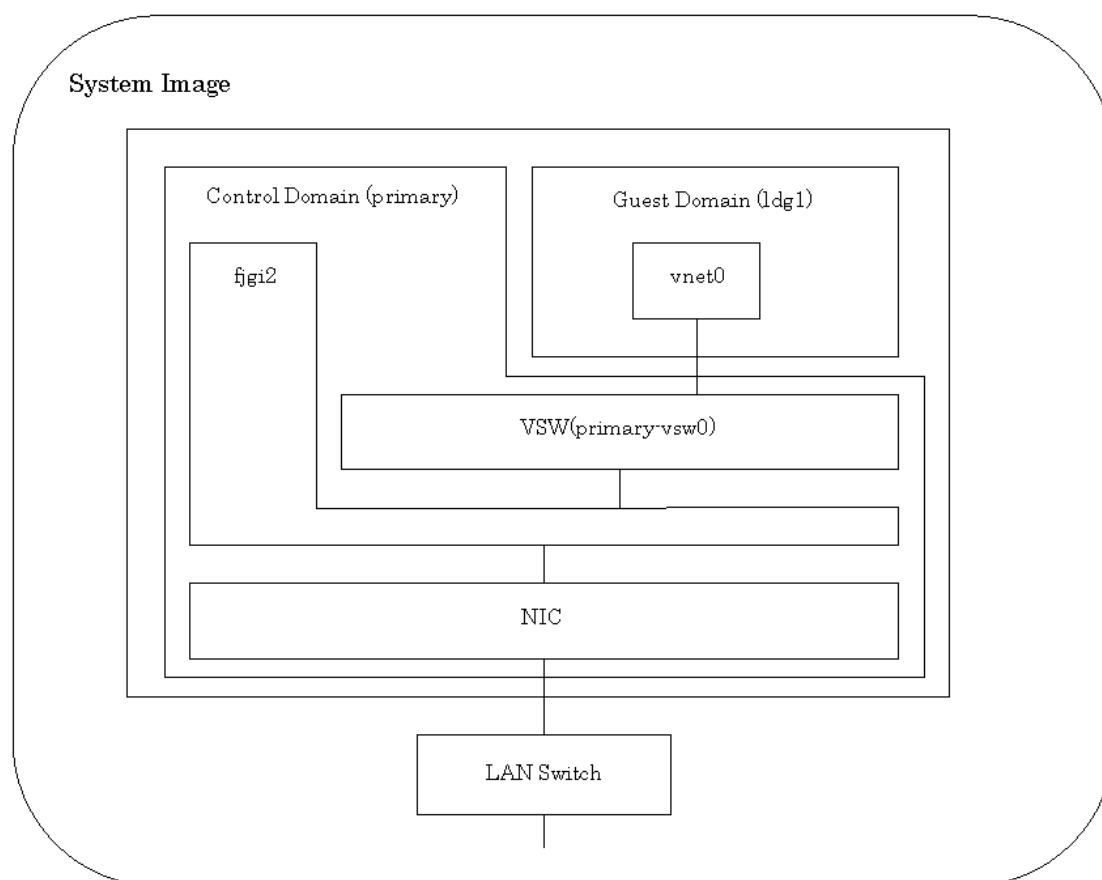
The FUJITSU PCI GigabitEthernet 4.1 or later or the FUJITSU PCI GigabitEthernet 5.0 or later driver supports the following features in Oracle VM Server for SPARC.

- Control Domain
- Service Domain
- Guest Domain
- Virtual Network (virtual switch (vsw) devices and virtual network (vnet) devices)

E.2 Oracle VM Server for SPARC Setup Procedure

Setup the Oracle VM Server for SPARC environment. For more information about the Oracle VM Server for SPARC environment, please refer to "Oracle VM Server for SPARC Administration Guide" of Oracle Documentation.

The examples below show the setting methods of virtual switch and virtual network devices.



- The following example shows how to add a virtual switch (vsw) device (ldm add-vsw)

```
/opt/SUNWldm/bin/ldm add-vsw net-dev=device vswitch_name ldom (device: network device
                                                                vswitch_name: virtual switch device
                                                                ldom: Logical Domain)
```

Example: Adding primary-vsw0 of fjgi2 to the Control Domain (primary).

```
# /opt/SUNWldm/bin/ldm add-vsw net-dev=fjgi2 primary-vsw0 primary
```

(Note 1) In Solaris 11, the vanity name (net4) is specified as fjgi2.

(Note 2) Reboot the Control Domain to make this setting effective.

Execute the following command from ok prompt.

```
ok boot -r
```

- The following example shows how to display a virtual switch (vsw) device (ldm list-services)

```
/opt/SUNWldm/bin/ldm list-services ldom (ldom: Logical Domain)
```

Example: Displaying services of the Control Domain (primary).

```
# /opt/SUNWldm/bin/ldm list-services primary
VDS
  NAME          VOLUME          OPTIONS          DEVICE
  primary-vds0

VCC
  NAME          PORT-RANGE
  primary-vcc0   5000-5100

VSW
  NAME          MAC          NET-DEV          DEVICE          MODE
  primary-vsw0   00:15:17:13:81:f8 fjgi2            switch@0        prog,promisc
```

(Note) In Solaris 11, the vanity name (net4) is specified as fjgi2.

- The following example shows how to add a virtual network (vnet) device (ldm add-vsw)

```
/opt/SUNWldm/bin/ldm add-vnet if_name vswitch_name ldom (if_name: virtual network device
                                                                vswitch_name: virtual switch device
                                                                ldom: Logical Domain)
```

Example: Adding a virtual switch (primary-vsw0) of fjgi2 to the Guest Domain (ldg1).

```
# /opt/SUNWldm/bin/ldm add-vnet vnet0 primary-vsw0 ldg1
```

(Note) Execute the following commands to make this setting effective.

If the Guest Domain has not started, execute the following commands.

```
# /opt/SUNWldm/bin/ldm bind-domain ldg1
```

```
# /opt/SUNWldm/bin/ldm start-domain ldg1
```

If the Guest Domain has already started, execute the following commands.

```
# /opt/SUNWldm/bin/ldm stop-domain ldg1
```

```
# /opt/SUNWldm/bin/ldm unbind-domain ldg1
```

```
# /opt/SUNWldm/bin/ldm bind-domain ldg1
```

```
# /opt/SUNWldm/bin/ldm start-domain ldg1
```

- The following example shows how to display a virtual network (vnet) device (ldm list-domain)

```
/opt/SUNWldm/bin/ldm list-domain -l ldom (ldom: Logical Domain)
```

Example: Displaying the status of the Guest Domain (ldg1).


```
# /opt/SUNWldm/bin/ldm list-domain -l ldg1
```

NAME	STATE	FLAGS	CONS	VCPU	MEMORY	UTIL	UPTIME
ldg1	active	-n---	5000	4	1G	0.5%	1h 17m

SOFTSTATE
Solaris running

VCPU

VID	PID	UTIL	STRAND
0	4	0.5%	100%
1	5	0.2%	100%
2	6	0.4%	100%
3	7	0.7%	100%

MEMORY

RA	PA	SIZE
0x8000000	0x48000000	1G

VARIABLES
 auto-boot?=true
 boot-device=vdisk1
 keyboard-layout=Japanese

DISK

NAME	VOLUME	TOUT	DEVICE	SERVER
vdisk1	voll@primary-vds0		disk@0	primary

VCONS

NAME	SERVICE	PORT
ldg1	primary-vcc0@primary	5000

NETWORK

NAME	SERVICE	DEVICE	MAC
vnet0	fjgi2-vsw@primary	network@0	00:14:4f:f9:fa:5f

(Note) In Solaris 11, the vanity name (net4) is specified as fjgi2.

E.3 Notes

- For more information about Oracle VM Server for SPARC, please refer to the "Oracle VM Server for SPARC Administration Guide" of Oracle Documentation.

Appendix F Using FUJITSU PCI GigabitEthernet in Solaris 11 Network Virtualization

This Appendix outlines the supported functions and setup procedure for the FUJITSU PCI GigabitEthernet 5.0 or later interface when used in Solaris 11 Network Virtualization.

F.1 Solaris 11 Network Virtualization Support

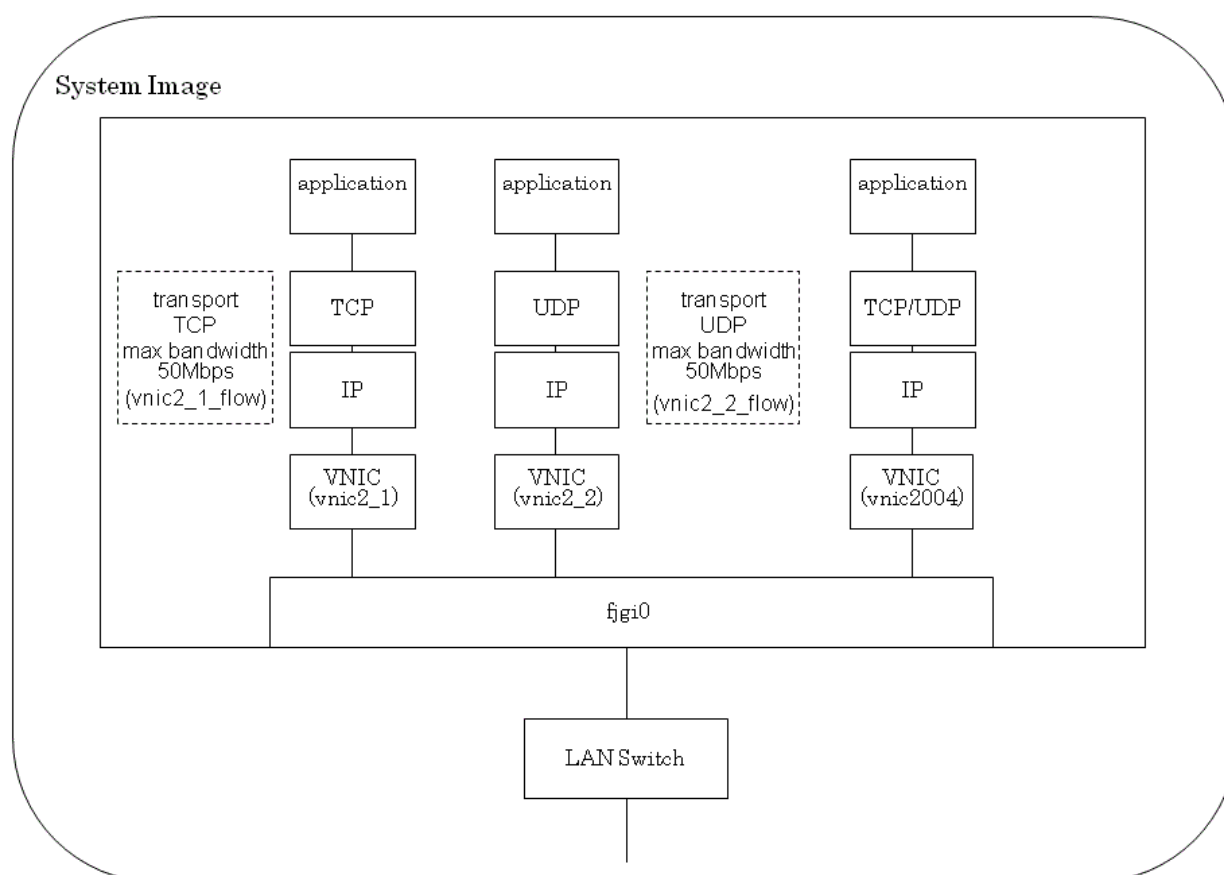
The FUJITSU PCI GigabitEthernet 5.0 or later driver support the following features in Solaris 11 Network Virtualization.

- VNIC by `dladm(1M)` command
- Flow by `flowadm(1M)` command

F.2 Solaris 11 Network Virtualization Setup Procedure

Setup Solaris 11 Network Virtualization. For more information about Solaris 11 Network Virtualization, please refer to "System Administration Guide: Network Interfaces and Network Virtualization" and "man pages section 1M: System Administration Commands" of Oracle Documentation.

The examples below show the setting methods of VNIC (virtual network interface) and flows.



- The following example shows how to create a VNIC (`dladm create-vnic`)

```
dladm create-vnic -l link vnic-link
```

(*link*: physical link,
vnic-link: link name of VNIC)

Example: Creating VNICs (vnic2_1 and vnic2_2) over fjgi0 (this vanity name is net2).

```
# dladm create-vnic -l net2 vnic2_1
# dladm create-vnic -l net2 vnic2_2
```

- The following example shows how to display VNICs (dladm show-vnic)

```
dladm show-vnic [vnic-link] (vnic-link: link name of VNIC)
```

Example: Displaying VNICs (vnic2_1 and vnic2_2).

```
# dladm show-vnic
LINK      OVER      SPEED  MACADDRESS      MACADDRTYPE      VID
vnic2_1   net2      1500   2:8:20:a5:f6:e4  random           0
vnic2_2   net2      1500   2:8:20:82:b:7a   random           0
```

- The following example shows how to create a VLAN interface over a VNIC (dladm create-vnic)

```
dladm create-vnic -l link -v vlan-id vnic-link (link: physical link,
vnic-id: VID,
vnic-link: link name of VNIC)
```

Example: Creating a VLAN interface over a VNIC (vnic2004) of fjgi2 (this vanity name is net4).

```
# dladm create-vnic -l net4 -v 2 vnic2004
```

- The following example shows how to display VLAN interfaces on VNICs (dladm show-vnic)

```
dladm show-vnic [vnic-link] (vnic-link: link name of VNIC)
```

Example: Displaying a VLAN interface (vnic2004).

```
# dladm show-vnic
LINK      OVER      SPEED  MACADDRESS      MACADDRTYPE      VID
vnic2004   net4      1500   2:8:20:b2:3:5f   random           1
```

- The following example shows how to create a flow over a VNIC (flowadm add-flow)

```
flowadm add-flow -l link -a attr=value[,...] -p prop=value[,...] flow
(link: physical link.
attr=value: attribute and value,
prop=value: property and value,
flow: flow name)
```

Example: Creating a flow (vnic2_1flow) with transport=tcp as an attribute, maxbw=50 as a property over a VNIC (vnic2_1).

```
# flowadm add-flow -l vnic2_1 -a transport=tcp -p maxbw=50 vnic2_1flow
```

Example: Creating a flow (vnic2_2flow) with transport=udp as an attribute, maxbw=50 as a property over a VNIC (vnic2_2).

```
# flowadm add-flow -l vnic2_2 -a transport=udp -p maxbw=50 vnic2_2flow
```

- The following example shows how to display flows over VNICs (flowadm show-flow)

```
flowadm show-flow [flow] (flow: flow name)
```

Example: Displaying flows (vnic2_1_flow and vnic2_2_flow) over VNICs (vnic2_1 and vnic2_2).

```
# flowadm show-flow
FLOW          LINK          IPADDR          PROTO  LPORT  RPORT  DSFLD
vnic2_1_flow  vnic2_1    --              tcp    --     --     --
vnic2_2_flow  vnic2_2    --              udp    --     --     --
```

- The following example shows how to display properties of flows over VNICs (flowadm show-flowprop)

```
flowadm show-flowprop [-p prop[,...]] [flow]          (prop: property,
                                                         flow: flow name)
```

Example: Displaying properties(maximum bandwidth) of flows (vnic2_1_flow and vnic2_2_flow) over VNICs (vnic2_1 and vnic2_2).

```
# flowadm show-flowprop -p maxbw
FLOW          PROPERTY      VALUE          DEFAULT  POSSIBLE
vnic2_1_flow  maxbw              50           --       --
vnic2_2_flow  maxbw              50           --       --
```

F.3 Notes

- For more information about Solaris 11 Network Virtualization, please refer to "System Administration Guide: Network Interfaces and Network Virtualization" and "man pages section 1M:System Administration Commands" of Oracle Documentation.

Appendix G PCI Slot Number and Device Name

This appendix provides a cross-reference of PCI slot numbers and device names for the following SPARC Enterprise models.

- - SPARC Enterprise M3000
- - SPARC Enterprise M4000/M5000
- - SPARC Enterprise M8000/M9000
- - SPARC Enterprise T1000
- - SPARC Enterprise T2000
- - SPARC Enterprise T5120
- - SPARC Enterprise T5220
- - SPARC Enterprise T5140
- - SPARC Enterprise T5240
- - SPARC Enterprise T5440 (4CPU)
- - SPARC Enterprise T5440 (2CPU)
- SPARC T3-1
- SPARC T3-2

- SPARC Enterprise M3000

Board Number		Slot Number	Device Name
Logical System Board #0	Basic PCI Slot	PCI#0	/pci@0,600000/pci@0/pci@8/****@0
		PCI#1	/pci@1,700000/pci@0/pci@0/****@0
		PCI#2	/pci@1,700000/pci@0/pci@8/****@0
		PCI#3	/pci@1,700000/pci@0/pci@9/****@0

- SPARC Enterprise M4000/M5000

Board Number		Slot Number	Device Name
Logical System Board #0	Basic PCI Slot	PCI#0	/pci@0,600000/pci@0/pci@8/pci@0,1/****@1
		PCI#1	/pci@0,600000/pci@0/pci@9/****@0
	PCI#1 IOBoat(X)	PCI#1-PCIX1	/pci@0,600000/pci@0/pci@9/pci@0/pci@1/pci@0/****@4
		PCI#1-PCIX2	/pci@0,600000/pci@0/pci@9/pci@0/pci@1/pci@0,1/****@4
		PCI#1-PCIX5	/pci@0,600000/pci@0/pci@9/pci@0/pci@8/pci@0/****@4
		PCI#1-PCIX6	/pci@0,600000/pci@0/pci@9/pci@0/pci@8/pci@0,1/****@4
		PCI#1-PCIX3	/pci@0,600000/pci@0/pci@9/pci@0/pci@9/pci@0/****@4
		PCI#1-PCIX4	/pci@0,600000/pci@0/pci@9/pci@0/pci@9/pci@0,1/****@4
	PCI#1 IOBoat(Ex)	PCI#1-PCIE1	/pci@0,600000/pci@0/pci@9/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#1-PCIE2	/pci@0,600000/pci@0/pci@9/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#1-PCIE3	/pci@0,600000/pci@0/pci@9/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#1-PCIE4	/pci@0,600000/pci@0/pci@9/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#1-PCIE5	/pci@0,600000/pci@0/pci@9/pci@0/pci@9/pci@0/pci@1/****@0

Board Number		Slot Number	Device Name
		PCI#1-PCIE6	/pci@0,600000/pci@0/pci@9/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#2	/pci@1,700000/****@0
	PCI#2 IOBoat(X)	PCI#2-PCIX1	/pci@1,700000/pci@0/pci@1/pci@0/****@4
		PCI#2-PCIX2	/pci@1,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#2-PCIX5	/pci@1,700000/pci@0/pci@8/pci@0/****@4
		PCI#2-PCIX6	/pci@1,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#2-PCIX3	/pci@1,700000/pci@0/pci@9/pci@0/****@4
		PCI#2-PCIX4	/pci@1,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#2 IOBoat(Ex)	PCI#2-PCIE1	/pci@1,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#2-PCIE2	/pci@1,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#2-PCIE3	/pci@1,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#2-PCIE4	/pci@1,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#2-PCIE5	/pci@1,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#2-PCIE6	/pci@1,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#3	/pci@2,600000/****@0
	PCI#3 IOBoat(X)	PCI#3-PCIX1	/pci@2,600000/pci@0/pci@1/pci@0/****@4
		PCI#3-PCIX2	/pci@2,600000/pci@0/pci@1/pci@0,1/****@4
		PCI#3-PCIX5	/pci@2,600000/pci@0/pci@8/pci@0/****@4
		PCI#3-PCIX6	/pci@2,600000/pci@0/pci@8/pci@0,1/****@4
		PCI#3-PCIX3	/pci@2,600000/pci@0/pci@9/pci@0/****@4
		PCI#3-PCIX4	/pci@2,600000/pci@0/pci@9/pci@0,1/****@4
	PCI#3 IOBoat(Ex)	PCI#3-PCIE1	/pci@2,600000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#3-PCIE2	/pci@2,600000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#3-PCIE3	/pci@2,600000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#3-PCIE4	/pci@2,600000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#3-PCIE5	/pci@2,600000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#3-PCIE6	/pci@2,600000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#4	/pci@3,700000/****@0
	PCI#4 IOBoat(X)	PCI#4-PCIX1	/pci@3,700000/pci@0/pci@1/pci@0/****@4
		PCI#4-PCIX2	/pci@3,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#4-PCIX5	/pci@3,700000/pci@0/pci@8/pci@0/****@4
		PCI#4-PCIX6	/pci@3,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#4-PCIX3	/pci@3,700000/pci@0/pci@9/pci@0/****@4
		PCI#4-PCIX4	/pci@3,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#4 IOBoat(Ex)	PCI#4-PCIE1	/pci@3,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#4-PCIE2	/pci@3,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#4-PCIE3	/pci@3,700000/pci@0/pci@1/pci@0/pci@9/****@0

Board Number		Slot Number	Device Name
Logical System Board #1		PCI#4-PCIE4	/pci@3,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#4-PCIE5	/pci@3,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#4-PCIE6	/pci@3,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#0	/pci@10,600000/pci@0/pci@8/pci@0,1/****@1
		PCI#1	/pci@10,600000/pci@0/pci@9/****@0
	PCI#1 IOBoat(X)	PCI#1-PCIX1	/pci@10,600000/pci@0/pci@9/pci@0/pci@1/pci@0/****@4
		PCI#1-PCIX2	/pci@10,600000/pci@0/pci@9/pci@0/pci@1/pci@0,1/****@4
		PCI#1-PCIX5	/pci@10,600000/pci@0/pci@9/pci@0/pci@8/pci@0/****@4
		PCI#1-PCIX6	/pci@10,600000/pci@0/pci@9/pci@0/pci@8/pci@0,1/****@4
		PCI#1-PCIX3	/pci@10,600000/pci@0/pci@9/pci@0/pci@9/pci@0/****@4
		PCI#1-PCIX4	/pci@10,600000/pci@0/pci@9/pci@0/pci@9/pci@0,1/****@4
	PCI#1 IOBoat(Ex)	PCI#1-PCIE1	/pci@10,600000/pci@0/pci@9/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#1-PCIE2	/pci@10,600000/pci@0/pci@9/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#1-PCIE3	/pci@10,600000/pci@0/pci@9/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#1-PCIE4	/pci@10,600000/pci@0/pci@9/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#1-PCIE5	/pci@10,600000/pci@0/pci@9/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#1-PCIE6	/pci@10,600000/pci@0/pci@9/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#2	/pci@11,700000/****@0
	PCI#2 IOBoat(X)	PCI#2-PCIX1	/pci@11,700000/pci@0/pci@1/pci@0/****@4
		PCI#2-PCIX2	/pci@11,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#2-PCIX5	/pci@11,700000/pci@0/pci@8/pci@0/****@4
		PCI#2-PCIX6	/pci@11,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#2-PCIX3	/pci@11,700000/pci@0/pci@9/pci@0/****@4
		PCI#2-PCIX4	/pci@11,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#2 IOBoat(Ex)	PCI#2-PCIE1	/pci@11,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#2-PCIE2	/pci@11,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#2-PCIE3	/pci@11,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#2-PCIE4	/pci@11,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#2-PCIE5	/pci@11,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#2-PCIE6	/pci@11,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#3	/pci@12,600000/****@0
	PCI#3 IOBoat(X)	PCI#3-PCIX1	/pci@12,600000/pci@0/pci@1/pci@0/****@4
		PCI#3-PCIX2	/pci@12,600000/pci@0/pci@1/pci@0,1/****@4
		PCI#3-PCIX5	/pci@12,600000/pci@0/pci@8/pci@0/****@4
		PCI#3-PCIX6	/pci@12,600000/pci@0/pci@8/pci@0,1/****@4
		PCI#3-PCIX3	/pci@12,600000/pci@0/pci@9/pci@0/****@4
		PCI#3-PCIX4	/pci@12,600000/pci@0/pci@9/pci@0,1/****@4

Board Number		Slot Number	Device Name
	PCI#3 IOBoat(Ex)	PCI#3-PCIE1	/pci@12,600000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#3-PCIE2	/pci@12,600000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#3-PCIE3	/pci@12,600000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#3-PCIE4	/pci@12,600000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#3-PCIE5	/pci@12,600000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#3-PCIE6	/pci@12,600000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#4	/pci@13,700000/****@0
	PCI#4 IOBoat(X)	PCI#4-PCIX1	/pci@13,700000/pci@0/pci@1/pci@0/****@4
		PCI#4-PCIX2	/pci@13,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#4-PCIX5	/pci@13,700000/pci@0/pci@8/pci@0/****@4
		PCI#4-PCIX6	/pci@13,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#4-PCIX3	/pci@13,700000/pci@0/pci@9/pci@0/****@4
		PCI#4-PCIX4	/pci@13,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#4 IOBoat(Ex)	PCI#4-PCIE1	/pci@13,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#4-PCIE2	/pci@13,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#4-PCIE3	/pci@13,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#4-PCIE4	/pci@13,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#4-PCIE5	/pci@13,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#4-PCIE6	/pci@13,700000/pci@0/pci@9/pci@0/pci@9/****@0

- SPARC Enterprise M8000/M9000

Board Number		Slot Number	Device Name
Logical System Board #0	Basic PCI Slot	PCI#0	/pci@0,600000/****@0
	Basic PCI Slot	PCI#1	/pci@1,700000/****@0
	PCI#1 IOBoat(X)	PCI#1-PCIX1	/pci@1,700000/pci@0/pci@1/pci@0/****@4
		PCI#1-PCIX2	/pci@1,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#1-PCIX5	/pci@1,700000/pci@0/pci@8/pci@0/****@4
		PCI#1-PCIX6	/pci@1,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#1-PCIX3	/pci@1,700000/pci@0/pci@9/pci@0/****@4
		PCI#1-PCIX4	/pci@1,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#1 IOBoat(Ex)	PCI#1-PCIE1	/pci@1,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#1-PCIE2	/pci@1,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#1-PCIE3	/pci@1,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#1-PCIE4	/pci@1,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#1-PCIE5	/pci@1,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#1-PCIE6	/pci@1,700000/pci@0/pci@9/pci@0/pci@9/****@0

Board Number		Slot Number	Device Name
	Basic PCI Slot	PCI#2	/pci@2,600000/****@0
	Basic PCI Slot	PCI#3	/pci@3,700000/****@0
	PCI#3 IOBoat(X)	PCI#3-PCIX1	/pci@3,700000/pci@0/pci@1/pci@0/****@4
		PCI#3-PCIX2	/pci@3,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#3-PCIX5	/pci@3,700000/pci@0/pci@8/pci@0/****@4
		PCI#3-PCIX6	/pci@3,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#3-PCIX3	/pci@3,700000/pci@0/pci@9/pci@0/****@4
		PCI#3-PCIX4	/pci@3,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#3 IOBoat(Ex)	PCI#3-PCIE1	/pci@3,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#3-PCIE2	/pci@3,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#3-PCIE3	/pci@3,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#3-PCIE4	/pci@3,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#3-PCIE5	/pci@3,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#3-PCIE6	/pci@3,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#4	/pci@4,600000/****@0
	Basic PCI Slot	PCI#5	/pci@5,700000/****@0
	PCI#5 IOBoat(X)	PCI#5-PCIX1	/pci@5,700000/pci@0/pci@1/pci@0/****@4
		PCI#5-PCIX2	/pci@5,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#5-PCIX5	/pci@5,700000/pci@0/pci@8/pci@0/****@4
		PCI#5-PCIX6	/pci@5,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#5-PCIX3	/pci@5,700000/pci@0/pci@9/pci@0/****@4
		PCI#5-PCIX4	/pci@5,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#5 IOBoat(Ex)	PCI#5-PCIE1	/pci@5,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#5-PCIE2	/pci@5,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#5-PCIE3	/pci@5,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#5-PCIE4	/pci@5,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#5-PCIE5	/pci@5,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#5-PCIE6	/pci@5,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#6	/pci@6,600000/****@0
	Basic PCI Slot	PCI#7	/pci@7,700000/****@0
	PCI#7 IOBoat(X)	PCI#7-PCIX1	/pci@7,700000/pci@0/pci@1/pci@0/****@4
		PCI#7-PCIX2	/pci@7,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#7-PCIX5	/pci@7,700000/pci@0/pci@8/pci@0/****@4
		PCI#7-PCIX6	/pci@7,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#7-PCIX3	/pci@7,700000/pci@0/pci@9/pci@0/****@4

Board Number		Slot Number	Device Name
		PCI#7-PCIX4	/pci@7,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#7 IOBoat(Ex)	PCI#7-PCIE1	/pci@7,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#7-PCIE2	/pci@7,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#7-PCIE3	/pci@7,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#7-PCIE4	/pci@7,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#7-PCIE5	/pci@7,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#7-PCIE6	/pci@7,700000/pci@0/pci@9/pci@0/pci@9/****@0
Logical System Board #1	Basic PCI Slot	PCI#0	/pci@10,600000/****@0
	Basic PCI Slot	PCI#1	/pci@11,700000/****@0
	PCI#1 IOBoat(X)	PCI#1-PCIX1	/pci@11,700000/pci@0/pci@1/pci@0/****@4
		PCI#1-PCIX2	/pci@11,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#1-PCIX5	/pci@11,700000/pci@0/pci@8/pci@0/****@4
		PCI#1-PCIX6	/pci@11,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#1-PCIX3	/pci@11,700000/pci@0/pci@9/pci@0/****@4
		PCI#1-PCIX4	/pci@11,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#1 IOBoat(Ex)	PCI#1-PCIE1	/pci@11,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#1-PCIE2	/pci@11,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#1-PCIE3	/pci@11,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#1-PCIE4	/pci@11,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#1-PCIE5	/pci@11,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#1-PCIE6	/pci@11,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#2	/pci@12,600000/****@0
	Basic PCI Slot	PCI#3	/pci@13,700000/****@0
	PCI#3 IOBoat(X)	PCI#3-PCIX1	/pci@13,700000/pci@0/pci@1/pci@0/****@4
		PCI#3-PCIX2	/pci@13,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#3-PCIX5	/pci@13,700000/pci@0/pci@8/pci@0/****@4
		PCI#3-PCIX6	/pci@13,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#3-PCIX3	/pci@13,700000/pci@0/pci@9/pci@0/****@4
		PCI#3-PCIX4	/pci@13,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#3 IOBoat(Ex)	PCI#3-PCIE1	/pci@13,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#3-PCIE2	/pci@13,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#3-PCIE3	/pci@13,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#3-PCIE4	/pci@13,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#3-PCIE5	/pci@13,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#3-PCIE6	/pci@13,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#4	/pci@14,600000/****@0

Board Number		Slot Number	Device Name
	Basic PCI Slot	PCI#5	/pci@15,700000/****@0
	PCI#5 IOBoat(X)	PCI#5-PCIX1	/pci@15,700000/pci@0/pci@1/pci@0/****@4
		PCI#5-PCIX2	/pci@15,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#5-PCIX5	/pci@15,700000/pci@0/pci@8/pci@0/****@4
		PCI#5-PCIX6	/pci@15,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#5-PCIX3	/pci@15,700000/pci@0/pci@9/pci@0/****@4
		PCI#5-PCIX4	/pci@15,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#5 IOBoat(Ex)	PCI#5-PCIE1	/pci@15,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#5-PCIE2	/pci@15,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#5-PCIE3	/pci@15,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#5-PCIE4	/pci@15,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#5-PCIE5	/pci@15,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#5-PCIE6	/pci@15,700000/pci@0/pci@9/pci@0/pci@9/****@0
	Basic PCI Slot	PCI#6	/pci@16,600000/****@0
	Basic PCI Slot	PCI#7	/pci@17,700000/****@0
	PCI#7 IOBoat(X)	PCI#7-PCIX1	/pci@17,700000/pci@0/pci@1/pci@0/****@4
		PCI#7-PCIX2	/pci@17,700000/pci@0/pci@1/pci@0,1/****@4
		PCI#7-PCIX5	/pci@17,700000/pci@0/pci@8/pci@0/****@4
		PCI#7-PCIX6	/pci@17,700000/pci@0/pci@8/pci@0,1/****@4
		PCI#7-PCIX3	/pci@17,700000/pci@0/pci@9/pci@0/****@4
		PCI#7-PCIX4	/pci@17,700000/pci@0/pci@9/pci@0,1/****@4
	PCI#7 IOBoat(Ex)	PCI#7-PCIE1	/pci@17,700000/pci@0/pci@1/pci@0/pci@0/****@0
		PCI#7-PCIE2	/pci@17,700000/pci@0/pci@1/pci@0/pci@1/****@0
		PCI#7-PCIE3	/pci@17,700000/pci@0/pci@1/pci@0/pci@9/****@0
		PCI#7-PCIE4	/pci@17,700000/pci@0/pci@9/pci@0/pci@0/****@0
		PCI#7-PCIE5	/pci@17,700000/pci@0/pci@9/pci@0/pci@1/****@0
		PCI#7-PCIE6	/pci@17,700000/pci@0/pci@9/pci@0/pci@9/****@0

- SPARC Enterprise T1000

Slot Number	Device Name
PCI-E	/pci@780/xxxxxxx@0[,y]

- SPARC Enterprise T2000

Slot Number	Device Name
PCI-E#0	/pci@780/pci@0/pci@8/xxxxxxx@0[,y]
PCI-E#1	/pci@7c0/pci@0/pci@8/xxxxxxx@0[,y]
PCI-E#2	/pci@7c0/pci@0/pci@9/xxxxxxx@0[,y]

- SPARC Enterprise T5120

Slot Number	Device Name
PCI-E#1	/pci@0/pci@0/pci@8/pci@0/pci@1/xxxxxxx@0
PCI-E#0	/pci@0/pci@0/pci@8/pci@0/pci@9/xxxxxxx@0
PCI-E#2	/pci@0/pci@0/pci@9/xxxxxxx@0

- SPARC Enterprise T5220

Slot Number	Device Name
PCI-E#1	/pci@0/pci@0/pci@8/pci@0/pci@1/xxxxxxx@0
PCI-E#4	/pci@0/pci@0/pci@8/pci@0/pci@2/xxxxxxx@0
PCI-E#5	/pci@0/pci@0/pci@8/pci@0/pci@8/xxxxxxx@0
PCI-E#0	/pci@0/pci@0/pci@8/pci@0/pci@9/xxxxxxx@0
PCI-E#3	/pci@0/pci@0/pci@8/pci@0/pci@a/xxxxxxx@0
PCI-E#2	/pci@0/pci@0/pci@9/xxxxxxx@0

- SPARC Enterprise T5140

Slot Number	Device Name
PCI-E#2	/pci@400/pci@0/pci@9
PCI-E#1	/pci@400/pci@0/pci@c
PCI-E#0	/pci@500/pci@0/pci@9

- SPARC Enterprise T5240

Slot Number	Device Name
PCI-E#2	/pci@400/pci@0/pci@9
PCI-E#1	/pci@400/pci@0/pci@c
PCI-E#3	/pci@400/pci@0/pci@d
PCI-E#0	/pci@500/pci@0/pci@9
PCI-E#5	/pci@500/pci@0/pci@c
PCI-E#4	/pci@500/pci@0/pci@d

- SPARC Enterprise T5440 (4CPU)

Slot Number	Device Name
PCI-E#5	/pci@500/pci@0/pci@9
PCI-E#4	/pci@500/pci@0/pci@d
PCI-E#1	/pci@400/pci@0/pci@c
PCI-E#0	/pci@400/pci@0/pci@d
PCI-E#2	/pci@600/pci@0/pci@c
PCI-E#3	/pci@600/pci@0/pci@9
PCI-E#7	/pci@700/pci@0/pci@9
PCI-E#6	/pci@700/pci@0/pci@c

- SPARC Enterprise T5440 (2CPU)

Slot Number	Device Name
PCI-E#3	/pci@400/pci@0/pci@8/pci@0/pci@9
PCI-E#4	/pci@400/pci@0/pci@8/pci@0/pci@c
PCI-E#1	/pci@400/pci@0/pci@c
PCI-E#0	/pci@400/pci@0/pci@d
PCI-E#7	/pci@500/pci@0/pci@8/pci@0/pci@9
PCI-E#6	/pci@500/pci@0/pci@8/pci@0/pci@c
PCI-E#5	/pci@500/pci@0/pci@9
PCI-E#4	/pci@500/pci@0/pci@d

SPARC T3-1

Slot Number	Device Name
PCI-E#0	/pci@400/pci@1/pci@0/pci@8
PCI-E#1	/pci@400/pci@2/pci@0/pci@8
PCI-E#2	/pci@400/pci@1/pci@0/pci@6
PCI-E#3	/pci@400/pci@2/pci@0/pci@c
PCI-E#4	/pci@400/pci@1/pci@0/pci@0
PCI-E#5	/pci@400/pci@2/pci@0/pci@a

SPARC T3-2

Slot Number	Device Name
PCI-E#0	/pci@400/pci@2/pci@0/pci@8
PCI-E#1	/pci@500/pci@2/pci@0/pci@a
PCI-E#2	/pci@400/pci@2/pci@0/pci@4
PCI-E#3	/pci@500/pci@2/pci@0/pci@6
PCI-E#4	/pci@400/pci@2/pci@0/pci@0
PCI-E#5	/pci@500/pci@2/pci@0/pci@0
PCI-E#6	/pci@400/pci@1/pci@0/pci@8
PCI-E#7	/pci@500/pci@1/pci@0/pci@6
PCI-E#8	/pci@400/pci@1/pci@0/pci@c